Better Homes and Gardens®

WOOD

THE MAGAZINE FOR HOME WOODWORKERS

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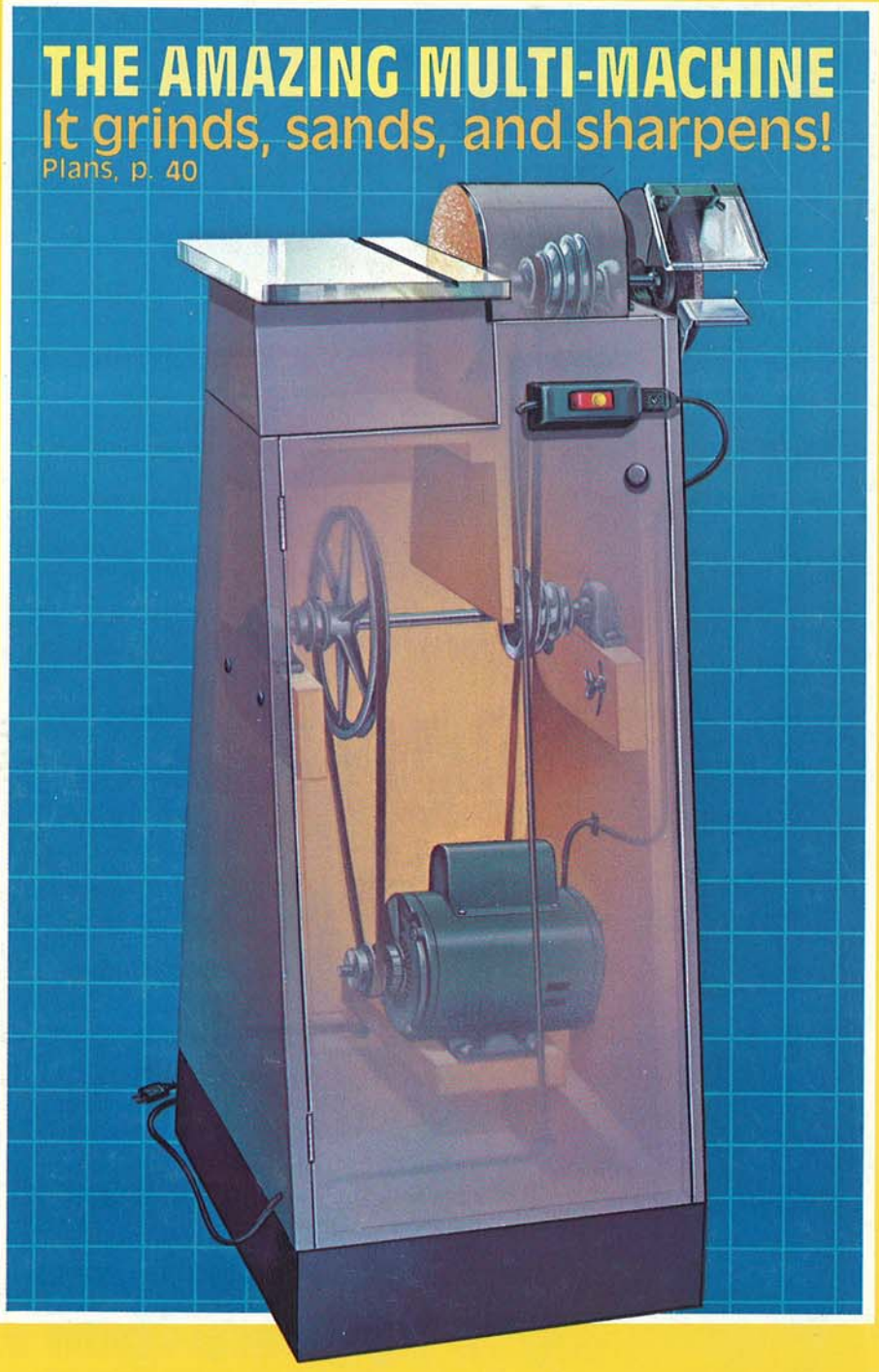
February 1986 • ISSUE NO. 9
Display Until February 18

BONUS! PULLOUT INDEX
Tips, projects, techniques from our first 8 issues

THE AMAZING MULTI-MACHINE
It grinds, sands, and sharpens!
Plans, p. 40



- **WOODWORKERS' STANDARDS**
  Nice-to-know design guidelines. In this issue: seating and tables
- **FURNITURE STRIPPING**
  Tips on removing that worn-out finish
- **JAPANESE HAND TOOLS**
  What makes them special?
- **'PEG' TREATMENT**
  The miracle that lets you work green wood
- **MORE PROJECT PLANS**
  Oak dining table, p. 64
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  3 terrific clocks, p. 78

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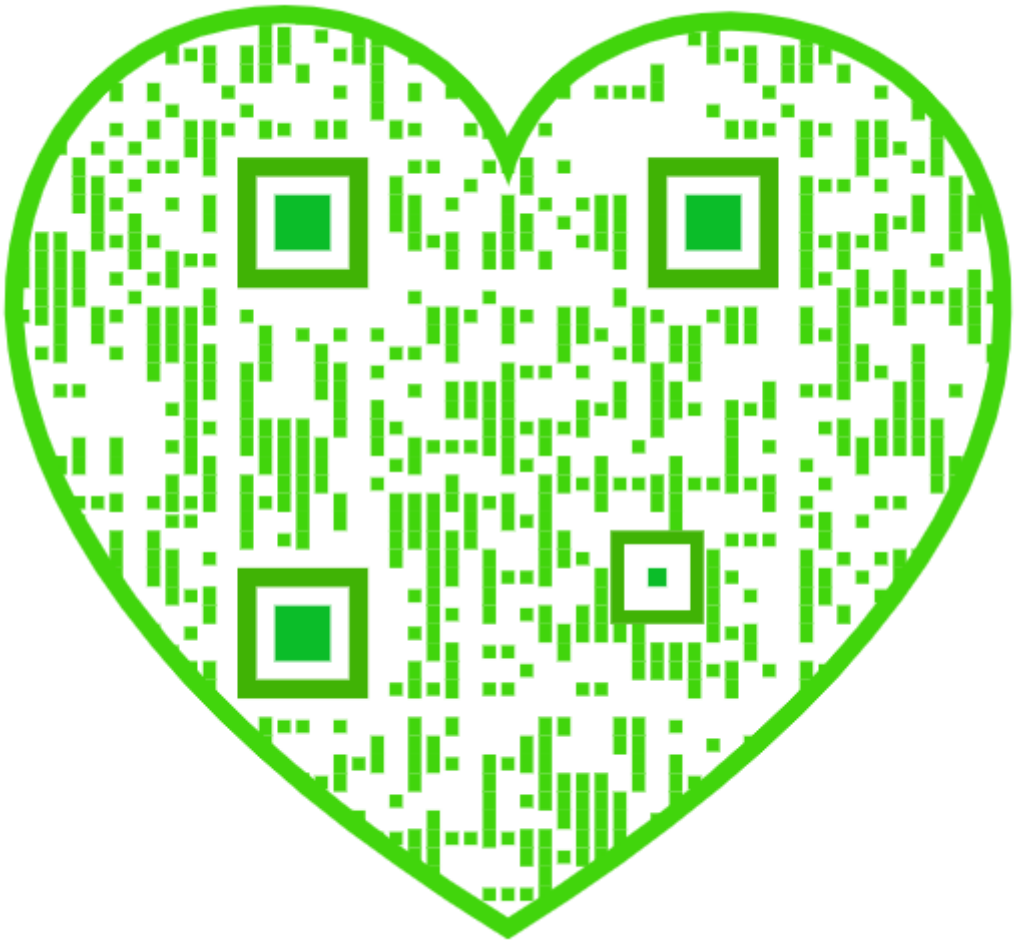

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WOOD

THE MAGAZINE FOR HOME WOODWORKERS

February 1986 • Vol. 3, No. 1 • Issue No. 9

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WOOD

THE MAGAZINE FOR HOME WOODWORKERS

FEBRUARY 1986 **ISSUE NO. 9**

WOOD PROFILE

BASSWOOD: "HOW SWEET IT IS!" 35

Carvers aren't the only ones who love this easygoing wood: The basswood's flower also finds its way into perfumes and honey.

CRAFTSMAN CLOSE-UP

SECRETS OF A PRODUCTION TURNER 36

Up Canada way, we visited the shop of a world-class turning expert. Now you can learn the priceless techniques that Bert Thompson acquired from his forebears.

HOMEMADE TOOL

THE AMAZING 8-SPEED MULTI-MACHINE 40

Even the term "multi-use" doesn't do justice to this incredibly hardworking homemade tool, designed for sanding, grinding, and sharpening.

PEG: THE MIRACLE TREATMENT THAT TURNS YOUR WOODPILE INTO A LUMBERYARD 46

It's fast and it's fun. It's also somewhat unpredictable. Let us introduce you to the fascinating chemical that "freezes" wood in its green state, preventing cracks, checks, shrinking, and warping.

TOOL BUYMANSHIP

MADE IN JAPAN: DO THE JAPANESE HAVE A BETTER HAND-TOOL IDEA? 50

More and more American woodworkers are becoming enchanted by hand tools from the Land of the Rising Sun. Why? Because these tools really work, often in surprising ways.

WOODWORKERS' STANDARDS: SEATING 54

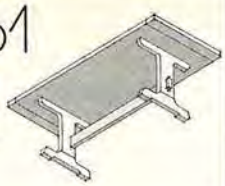
Standard dimensions have been refined by woodworkers through the years, but they're often difficult to look up in one place. We aim to correct that in this and upcoming issues of *WOOD*. Here we'll discuss how to scale truly comfortable seating.

CUMULATIVE INDEX: ISSUES 1 THROUGH 8 57

We've compiled all the projects, techniques, buymanship advice, and other topics from our first eight issues into a handy, pullout index.

WOODWORKERS' STANDARDS: TABLES 61

When you set out to design a table, you probably know what style and function you want. You also need an idea of how to support it, and what the dimensions should be. Here's help.



FURNITURE PROJECT

YOUR TABLE IS WAITING! EXPANDABLE OAK DINING TABLE 64

This elegant oak dining table extends to accommodate up to eight in grand style. Build yours with a top of oak veneer, or opt for the durability of a laminate top.

A JEWELRY BOX OF A DIFFERENT STRIPE 70

Beautiful West African zebrawood makes this three-drawer box just as eye-catching as its contents. It's a beauty, fit for a sweetheart!

FINISHING AND REFINISHING

OFF WITH THE OLD: A WORKSHOP GUIDE TO FURNITURE STRIPPING 72

The key to success in any furniture stripping project lies with the chemical you choose to do the job, and in applying it properly. See what we mean in this step-by-step feature.

HOME ACCESSORY PROJECTS

TIME AND TIME AGAIN: 3 GREAT CLOCKS TO BUILD 78

Build this striking see-through pendulum clock with the clock movement showing, or with the burled-veneer face.

Our Art Deco mantel clock is almost embarassingly fast and easy to make. We won't tell if you don't. . . .

The things you can do with wood! By laminating curly maple with the edge grain up, we achieved a luminous look similar to that of a real fish (only this one won't get away).

SHORT-SUBJECT FEATURES

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Woodworkers' Hardware ORDER FORM

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Black Hammer Hinge
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Screw for Above
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Birch Mug Peg
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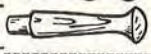

Birch Shaker Peg
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Birch Furniture Spindles
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Oak ~~$.35/ea.~~ $.21/ea.

#S5 Galley Spindle
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1" ~~$11.58/C~~ $6.95/C
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1 1/2" ~~$18.35/C~~ $11.01/C
1 3/4" ~~$26.00/C~~ 15.60/C

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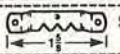

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	#03	1/2" R	1/2"	1½"	5/8"	15.00
		ROUND OVER				
	#04	1/4" R	1/4"	1"	1/2"	15.00
	#05	3/8" R	3/8"	1¼"	5/8"	16.00
	#06	1/2" R	1/2"	1½"	3/4"	19.00
		ROMAN OGEE				
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	#08	1/4" R	1/4"	1½"	3/4"	20.00
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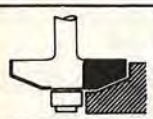
	#09	1/8" (KERF) SLOT CUTTER		1¼"	1/8"	14.00
	#10	1/4" (KERF) SLOT CUTTER		1¼"	1/4"	14.00
	#12	45° CHAMFER	45° Angle	1½"	5/8"	15.00
	#15	RAISED PANEL	20° Angle	1-5/8"	1/2"	25.00
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	#21	3/4" CORE BOX	3/8"	3/4"	5/8"	18.00
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	#26	3/8" Straight Bit		3/8"	1"	7.00
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THE EDITOR'S ANGLE

Never turn your back on an angry band-saw blade

Our Managing Editor does battle with a wily band-saw blade.

The other day when I offered to show Dan Kaercher, *WOOD's* Managing Editor, how to fold a band-saw blade, I asked him to come into the shop so I could record the experience photographically. Just for fun, we outfitted him in battle garb. Being fairly new to woodworking, Dan didn't know what to expect. But in a matter of minutes, he had the technique down pat. And, boy, was he proud!

When I saw Dan's sense of satisfaction, I was reminded once again of the truism that nothing is difficult once you know how to do it. And that's one of the main reasons why we are beginning a series of articles under the heading "Develop Your Shop Skills Step-by-Step." In it, we'll cover a myriad of topics that will add to your overall woodworking skill level. In this issue you can learn one good way to fold a band-saw blade on page 14. And in upcoming issues, we'll cover topics such as how to adjust a hand plane, sharpen and set jointer blades, turn your router into a precision circle cutter, change step pulleys on adjustable-speed motors, and much more—all step-by-step.

Two other series also make their debut this time out. In the first installment of "Talking Shop with Our Project Builder" on page 95, Jim Boelling explains why he uses the "dead-reckoning approach" to measurement when building a project. And don't miss our first "Woodworker's Standards" article, which summarizes some hard-to-find design standards for seating and tables. Look for it on page 54.

Larry Clayton

Print this article

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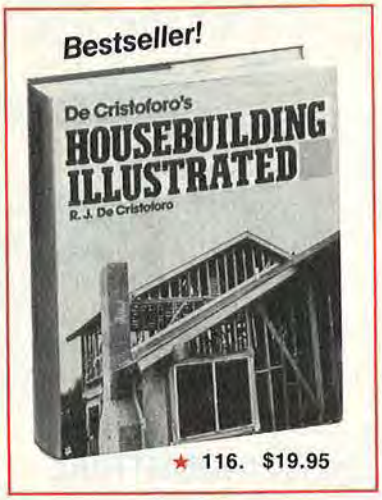

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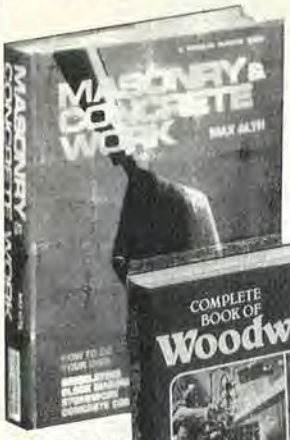

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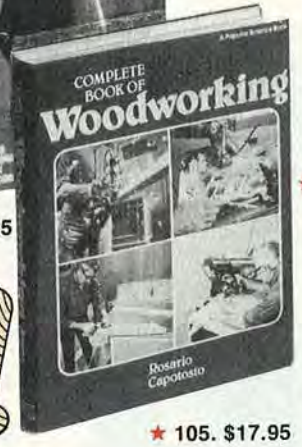

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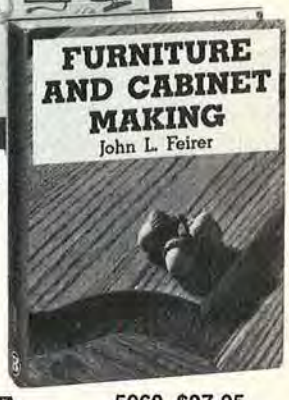

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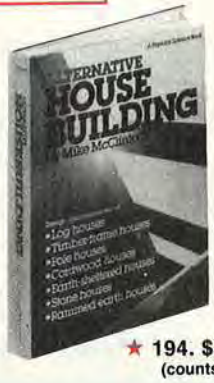

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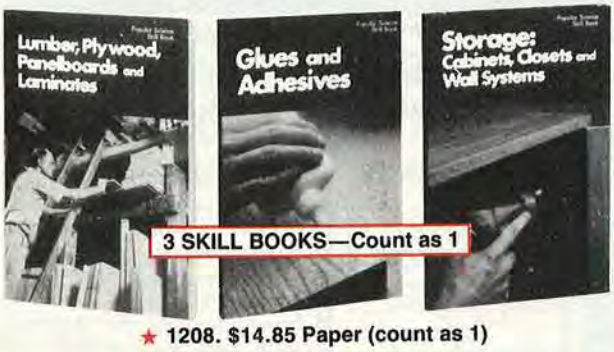
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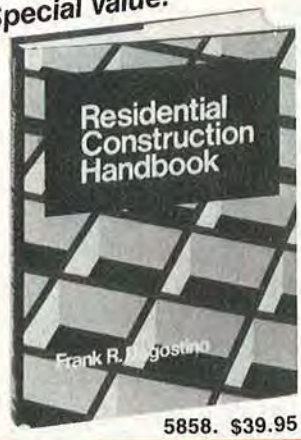

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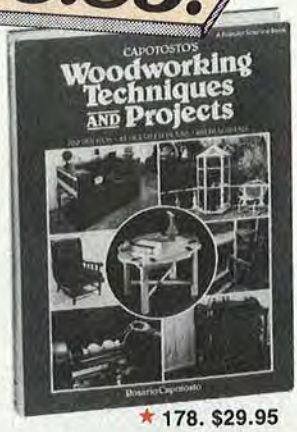

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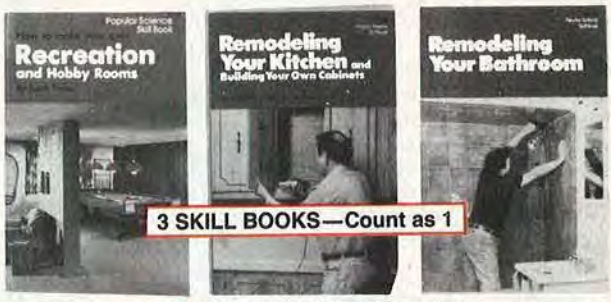
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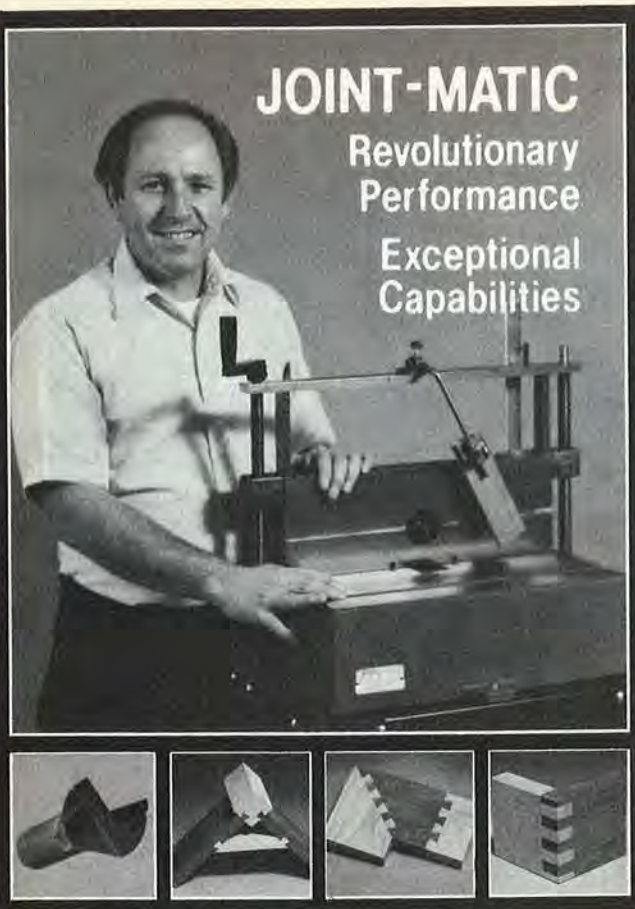

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You have stated that flexible veneer can be ordered in sheets as large as 4×12′. This is exactly what I am looking for. Where can I order it?

—Steven J. Shapiro, Methuen, Mass.

One manufacturer that can help is Laminating Services, 4700 Robards Lane, Louisville, KY 40218 (phone 502-458-1502). They suggested a distributor in your area: Design Wall Covering, 225 California, Newton, MA 02158. For readers in other areas, call or write Laminating Services for a distributor near you.

SURFACE SANDER UPDATE

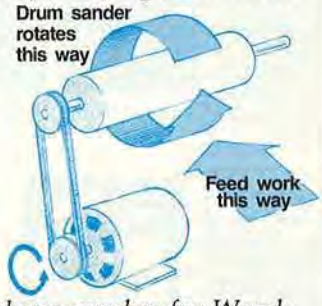
The fun, and sometimes frustrating, thing about working here at WOOD *is that somebody invariably comes up with a better idea—or at least an alternative.*

All indications are that the surface sander, which appeared in our October issue (p. 48), made a big hit with WOOD *readers. Many took the time to send in comments and suggestions. Here's what we learned:*

- *There's an excellent alternative to the wooden sanding drum and adhesive-backed paper suggested in our original plans. Universal Clamp Corp. wrote to tell us of an aluminum drum that takes precut sanding belts. Spring tension keeps the easy-to-replace belts tight as they wear and stretch.*

Our shop test indicates that the drum is well machined. It comes with an extended shaft, which must be cut to length. The shaft measures ½" diameter, compared to ⅜" with the wooden drum. The aluminum drum comes complete with shaft, field pillow-block bearings, and 4" pulley. (Note: You may need to move the mounting holes slightly.)

If you're interested, request further information, or place your order with Universal Clamp Corp., Dept. W, 6905 Cedros Ave., Van Nuys, CA 91405 (phone 818-780-1015). The drum, shaft, bearings, and three assorted belts are $92.50 postpaid. Order three replacement belts (80, 100, and 120 grit), cut to size, for $12.50.



- *In case you hadn't figured this out: You must wire your motor to rotate the drum as shown in the drawing,* right.
- *The correct address and phone number for Woodmaster Tools in the Buying Guide is: 2908 Oak, Kansas City, MO 64108 (phone 800-821-6651).*

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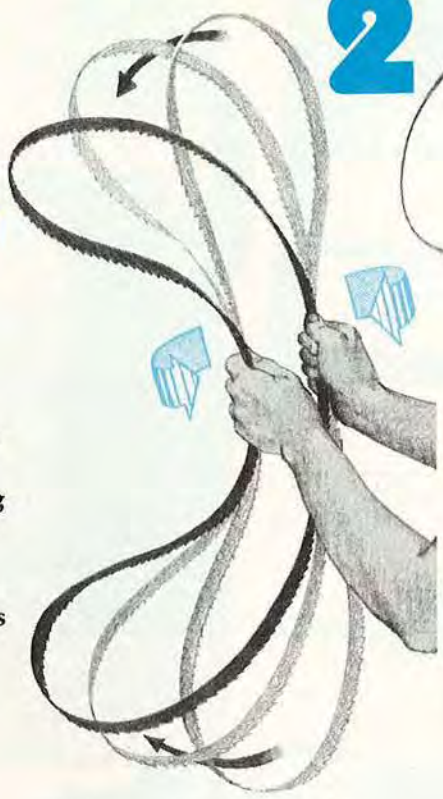
HOW TO FOLD AN UNRULY BAND SAW BLADE

No doubt about it! Anyone who has nerve enough can unfold a band saw blade. Just grab it in one hand, remove the ties securing it in its innocent-looking configuration, hold the darn thing out away from you, and watch all the commotion as it gyrates and twists its way to its ready-to-use shape. But folding it again—that's the trick. There are several ways to go about it. Here's one that works particularly well for us.

1

Start by grabbing hold of the blade as shown *above*. Two things to keep in mind here: Make sure that the teeth face you and that the loops above and below your hands are about the same size.



2

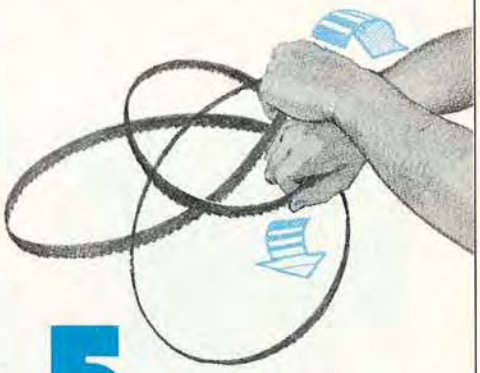
With your hands about 6" apart, rotate both hands inward (you may notice some discomfort here as the teeth dig into your thumbs—just kidding!). Both ends of the blade will move away from you. If they don't, move your hands closer together and try again.

3

Once you've forced the blade into submission, pass the left hand over the right one. We show you the action in this and the following two sketches, but the whole thing occurs within a matter of seconds.

4

You can see here that as the left-hand-over-right-hand action progresses, the blade begins to contort. Don't worry, it's supposed to do that.



5

At the completion of the motion, the blade "magically" forms a series of rings, which you need to capture quickly with one of your hands. You may have to practice this technique several times to get it down pat, but you'll be the master of your blades in no time at all.

6

Now comes the easy part. Just shake the blade a few times to equalize the size of the rings, bind them together with masking tape, and store.

Illustrations: Jim Stevenson

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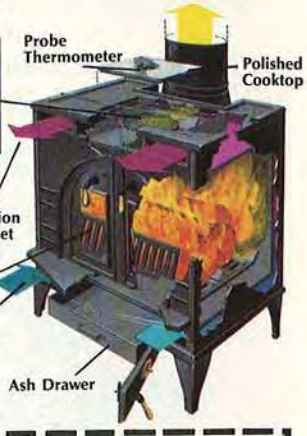

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In woodworking, as in life, no one knows it all. But through experience, we all discover—or stumble onto—better, safer, faster, or easier ways to do things. When we devise interesting tips or techniques, we'll share them with you in this column. And when you send us your favorites, we'll pay you $25 for each submission we publish. No shop tips can be returned. Mail your tips to:

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One-string shop apron

Shop aprons always are difficult to tie and untie behind your back, but it becomes a really knotty problem when the strings begin to unravel.

TIP: Snip off both of the old strings and replace one of the strings with a piece of new twill tape (available at fabric stores). Sew one piece of matching nylon hook and loop tape to the end of the new apron string. Sew the other half of the fastening tape to the body of the apron. You now can quickly fasten and unfasten the apron with one hand.

—Myron Nixon, Longmont, Colo.

Stripping small parts: Leave 'em hanging

Stripping finish from small parts, such as drawer pulls, is time consuming and wastes a lot of finish remover.

TIP: Remove the part from the piece, replace the screw, and tie a 12″ piece of string around the screw. Fill a coffee can with enough finish remover to cover the part. Drop the part into the coffee can, hang the string over the edge, and cover the can with the plastic lid. Soak and clean as recommended in the refinisher instructions.

—Tom Brower, Northboro, Mass.

Knee-jerk reaction for table-saw safety

You're making a cut on your table saw when, halfway through, the workpiece goes askew. Yet you can't shut off the saw without taking your hands off the workpiece. It can be a major shop safety problem. What do you do?

TIP: Buy a safety switch that pulls out for the "on" position and pushes in for the "off" position. Mount the switch on the front of your table saw at knee height. Now, turning off your saw is as easy as pushing your knee against the switch.

These switches have an added safety feature: Each comes with a plastic key that you can remove to keep little ones from turning on your saw.

—Bruce Wedan, Des Moines, Ia.

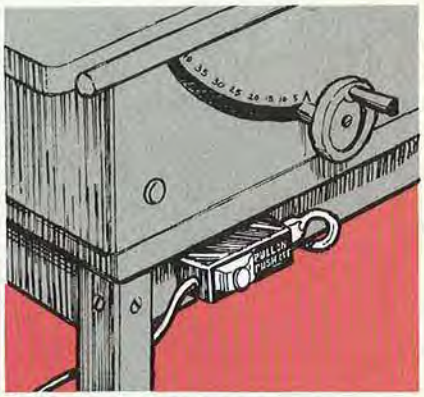
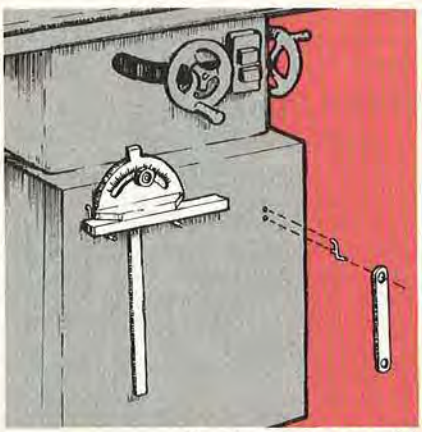


Table-saw gear: Hang it here

Finding a place to lay your table-saw wrench and miter gauge presents a challenge in everyone's shop. Too often they fall or get pushed to the floor and need to be recalibrated, too.

TIP: Use hooks designed for perforated hardboard to keep table-saw accessories right at your fingertips. Drill two 3/16″ holes about 1″ apart on the side of the saw. Because of the flat surface, straight hooks are best for the miter gauge; curved hooks are suitable for securely holding the wrench.

—Richard J. Wessels, St. Louis Park, Minn.



Continued on page 20

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TIPS FROM YOUR SHOP AND OURS

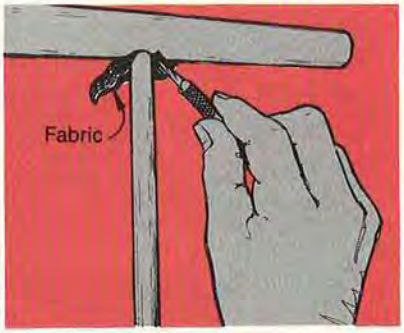
Continued from page 18

Quick cure for wobbly joints

Although the size of most mortise or dowel holes remains the same, wood fitting into the joint often shrinks over the years and creates a loose fit in chairs and tables.

TIP: Use a piece of linen or sheet between the wooden parts. Coat the cloth and hole liberally with glue. After you've fit the pieces together, wipe off the excess glue with a damp rag, and trim the unneeded cloth with a knife or razor blade.

—Larry Bedain, North Swanzey, N.H.



Tight-squeeze brush cleaning

Because so much paint and varnish remain in a brush after it's been used, a lot of expensive mineral spirits and other brush cleaners wind up being wasted.

TIP: More effective than wiping your brush on a scrap piece of wood or cardboard is trapping paint or varnish between several layers of newspaper or magazine pages. Use finger pressure to squeeze the bristles while you withdraw the brush. Use mineral spirits or your favorite brush cleaner to remove the remaining paint or varnish.

—W. J. Morrison, Northport, N.Y.

Continued on page 22

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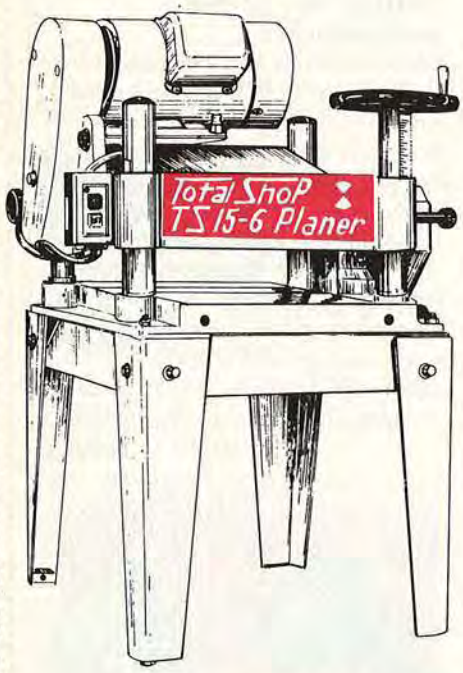

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TIPS FROM YOUR SHOP AND OURS

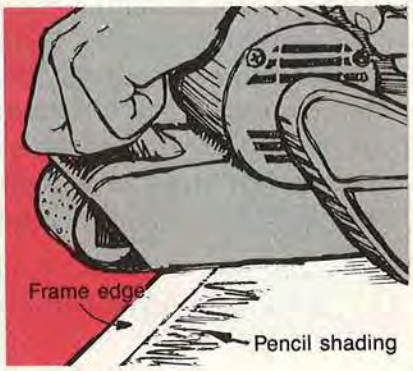
Continued from page 20

Know when to stop sanding

It's all too easy to sand through the thin veneer of plywood and fibercore lumber when belt-sanding a finished frame edge, whether in a cabinet or a picture frame.

TIP: Shade a wavy pencil line on the veneer edge that butts up against the frame. Stop sanding the joint just after the pencil line disappears. The same technique works well on banded tops and shelves.

—Terry Leach, Lovington, Ill.



Getting that darned knob attached

Some wood isn't thick enough to drill into to hold a knob like the one shown here. Or worse yet, you can't start a screw through the back of the dimensional lumber.

TIP: Make your own hanger bolts to secure the knob. First install a sheet-metal screw into the knob (try a 2½″ or 3″ no. 8 screw). Then saw off the head of the screw and grind the top to a point. Drill a hole in the drawer or door and fasten them together.

—Marion L. Adams, New Salisbury, Ind.

Continued on page 24

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TIPS FROM YOUR SHOP AND OURS

Continued from page 22

This tip is on the level

In a garage or crowded workshop, it's time consuming to reposition stationary tools on a level spot.

TIP: Once you've found that perfect level spot, spray paint around each leg to mark the position. The next time you use the power tool, roll it to the correct marked position.

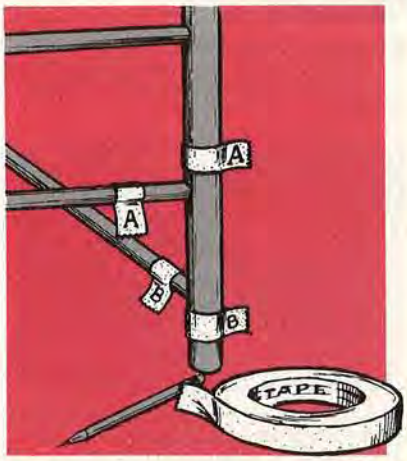
—Frank Zalenski, Vancouver, Wash.

Fitting the pieces back together

After completely taking apart a chair for regluing, all the legs and rungs suddenly look alike. And just as suddenly, you have an assembly problem.

TIP: Before taking the chair apart, label all the parts with numbered or lettered masking tape. After you clean the joints, use your identification system to correctly glue and reassemble. When the glue dries and the clamps are removed, peel off tape markers.

—John Paul Christopher, North Kansas City, Mo.



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RIP—COMBINATION—FINE CROSSCUT

Made in America and maintained here in America for your benefit.
Keep like-new performance! Use our superior micro-edge factory sharpening!

Jim Forrest, President and designer, microscoping cutting edge.

WOODWORKER I (For the Radial Saw) This is my *original* Woodworker blade—most desired by the American craftsman. Kerf: $^{3}/_{32}$". 60 teeth. Modified triple-chip with micro-finish grind. Carbide C-4 hard & 40% stronger. **Perfect, polished cuts in every direction.** The one blade that does it all—for as long as you'll cut wood or plastics. Designed for use primarily on your radial saw, thin kerf gives better control and less bottom splinter.

WOODWORKER II (For the Table Saw) My new **ALL PURPOSE** blade—*Primarily* for your table-saw ⅛" kerf. 30 to 40 teeth (see below). Modified alternate-bevel with micro-finish grind. Exclusive Forrest 400 carbide. Designed for super-fast and planer action in ripping heavy, solid stock with **smooth-as-sanded surface. We rip 2" Red Oak with 1 HP at the shows leaving surface smoother than a planer.** Slices ply-panels, particle-board and one-sided laminates *quick* and *clean.* Crosscuts and miters with equal quality and ease and no bottom splintering. Generally, I recommend 40 teeth. However, if your ripping includes a lot of heavy 1½" to 2" hardwoods, specify 30 teeth. See dampener information. Available in 8", 9" and 10" diameters.

***AVOID* cheap imports! WOODWORKER II eliminates scratchy saw cuts!!**

We're proving everything we say in our ads—in major shows across the country.

SPECIAL WINTER SALE Dec.—Mar. 86

		WAS	NOW 50% OFF
WOODWORKER I			**(Radial Saw)**
10" 60T		$162	**$81**
9" 60T		156	**79**
8" 60T		150	**75**
WOODWORKER II			**(Table Saw)**
10" 40T		$156	**$78**
30T		135	**68**
9" 40T		146	**73**
30T		125	**63**
8" 40T		136	**68**
30T		115	**58**
7¼" 30T		112	**49**
7" 30T		112	**49**
8" 24T	Dado	299	**209**

Shipping $2.50

DAMPENER-STIFFENER One Side Aids A Smoother, Quieter Cut!!
• Holds blade **rigid and true** for better cuts on your machine. • Dampens out **motor and belt** vibrations from being transmitted up to the rim of the teeth causing scratchy cuts. • Greatly reduces **cutting noise.** • Helps kill saw **scream-whistle** from any vibrating blade surface. • Is hardened and precision ground parallel and **flat within .001"** to keep your blade true.

• Can be removed instantly if need requires for deep cuts. • One against the outside leaves blade **centered** in slot of **steel** table insert. • 6" dampener on 10" blade gives 2" cutdepth. Use 5" dampener if always in 1½-2" deep cuts. Remove or use 4" for 3" cuts. For 8" and 9" blades, figure dampener size accordingly.

6" Dampener $23 • 5" Dampener $22 • 4" Dampener $20 *Add $1 Shipping*

WE RECOMMEND OUR FACTORY SHARPENING... 2-3 DAYS ON THESE AND ALL MAKES OF CARBIDE TIP SAWS. *Ship in UPS or P.P. 10×40T $14*
NOW... ORDER the one blade that will outlast you! (10-20 sharpenings possible).

Your cutting satisfaction guaranteed or full cash or credit refund.
40 years of fine American Sawmaking and Sharpening.

Dealer Inquiries Welcome.

We honor Amex, Visa & MasterCard, Money Orders, Personal Checks and CODs.

To Order By Mail: *Clip ad, circle choices and enclose payment.* ***Or PHONE TOLL FREE!***
1-800-526-7852 *(In NJ: 201-473-5236)*

FORREST MANUFACTURING COMPANY, INC.
250 Delawanna Ave., Clifton, NJ 07014

FORREST

PRODUCTS THAT PERFORM

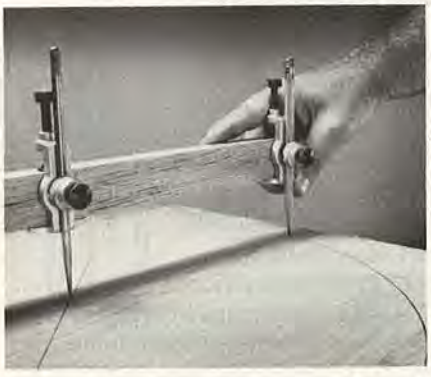
Print this article

Avoiding sticky situations

No matter how careful you are, a little glue always lands where you don't want it—on your fingers, on the floor, or down the side of your project. Here's a solution: This easy-to-clean tool applies glue in a smooth, even coat. All you do is pop open the stopper, squeeze the bottle, and roll the right amount of glue. *Glue Tool. $12 postpaid from Woodworking Apparatus, Dept. W, 209 Pickford Ave., Buffalo, NY 14223.*

A clear advantage

Make the most of any piece of stock by laying out bowls and platters with this handy template. Because it's grooved to show eight different diameters, the template can help eliminate trial and error in spotting grain, color, and defects. To mark cutting lines, insert a nail in the center hole and a pencil in the correct diameter hole. *Layout Template. $7.95 postpaid from Craft Supplies USA, Dept. W, 1644 S. State St., Provo, UT 84601.*



Get the point?

When you need to measure beyond the range of your present compass or dividers, use these trammel points clamped to a board of almost any length. Both aluminum trammels have steel points, and either one can be removed and replaced by a pencil to make a large-scale compass. *Trammel Points. $21 postpaid. We obtained ours from The Woodworkers' Store, Dept. W, 21801 Industrial Blvd., Rogers, MN 55374.*

Continued on page 31

We'll pay you $200 for your finished model of this magnificent clipper ship!

(If you want to part with it!)

Here's a hobby that pays off twice—in fun and in cash! Cash that will more than double your investment in this fine historic wooden ship model kit—at absolutely no risk! Imagine! You can build the sleek-hulled *Harvey*, typical of the Baltimore Clippers used by American Colonists against the British in the early 1800's. And you have our guarantee that we'll buy it back from you for more than double what you paid for it.

The *Harvey* measures an impressive 37" long from transom to bowsprit, and her masts tower 27" high. She's delicately rigged and fully armed with eight beautifully turned brass cannon. Even if you've never built a quality, plank-on-frame wood ship model before, you can build the *Harvey*, specially designed for the ambitious beginner.

Our No-Risk "Buy-Back" Offer

Order the *Harvey* kit, today. We'll guarantee to buy back your finished model for $200 anytime within 6 months of purchase.

We can make this no-risk offer because we can *resell* your finished model—quickly, and at a substantial profit. (You must know that ship models are in great demand by collectors and auctioneers—for executive offices, banks, and restaurants everywhere. And by decorators with clients who delight in a nautical motif for their home.)

But *you'll* profit, too! By experiencing the relaxing pleasure and pride of accomplishment of this fascinating hobby. Or by selling other models you can build, yourself.

Either way, we're sure you'll be back for more! And we've dozens of other models you can build. We'll send you our 116-page, full color catalog, FREE, with your order, to whet your appetite. Just mail the coupon below. Or for faster service on credit card orders, call TOLL-FREE **800-228-2028 ext. 68.** (In Nebraska, call 800-642-8300.) We'll rush your model kit, tools, and materials to you so you can get started right away!

The secret's in our kit!

We've done the hard work for you—nearly all wooden parts are *pre-cut*, to make assembly easy. Premium woods, such as beech and Afrikan walnut, are used throughout. All fittings—of brass, copper, and hardwoods—are included. And giant plans and clear, step-by-step instructions virtually take you by the hand and guide you every step of the way. The result? A museum quality, historic wooden ship model you can display with pride to friends and family. Or, you can cash in on our special "buy-back" offer that gives you an instant, *guaranteed* profit.

You get everything you need to build:

1. Complete *Harvey* kit—including wood, fittings, and plans.
2. All the tools and materials you'll need—$30 worth! Includes miniature pliers, hammer, knife, file, tweezers, sandpaper, glue, wood oil, and more.
3. 110-page ship modeler's handbook.
4. Display base for your finished model.
5. OUR GUARANTEE to buy your finished model for $200 anytime within 6 months of purchase. (Just send a photo of your finished model and we'll give complete instructions for packing and shipping to us.)

$129.95 value

Special Introductory price, only $89.95 for everything!

Order No. AL502TM

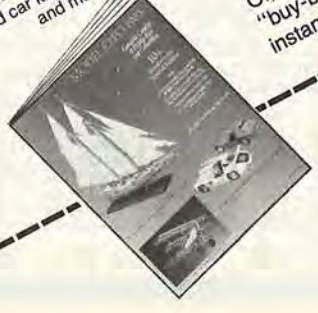
YOU KEEP THE TOOLS AND THE BOOK AS AN EXTRA BONUS WHEN YOU SELL YOUR MODEL—TO HELP YOU GET STARTED ON YOUR NEXT ONE!

Our Unconventional Guarantees:

- If less than delighted, you may return your purchase within 30 days for a full refund.
- If you break, damage, or lose a part during construction, we'll replace it without charge.
- If you have any questions while building, call us. We have experienced modelers standing by to help.

FREE with your order

116-page, full color catalog of other ship models you can build. Plus hundreds of other items—cannon and car kits, planes, trains, and more! $3 value.



MODEL EXPO, INC. 23 Just Road, Fairfield, N.J. 07007 **Dept. BHW-26**

☐ **YES!** I want to make money on my hobby. Send me your *Harvey* kit and "Buy-Back" package, as described.

☐ My check or money order for $89.95 (plus $7.50 shipping and guaranteed delivery) is enclosed. (New Jersey residents please add 6% sales tax.)

AL502TM

☐ Charge my credit card: ☐ MasterCard ☐ Visa ☐ American Express

Card No.

Exp. Date

Signature

Name

Address

City

State Zip

MODEL EXPO, INC. 23 JUST ROAD, FAIRFIELD, N.J. 07007

RYOBI TOOLS

		List	Sale
S500A	3x5½ Finish Sander	70	41
SU6200	Finishing Sand. ½ Sheet	142	88
B7075	3x21" dustless Belt Sand.	179	116
B7100	3x24" dustless Belt Sand.	208	140
B7200A	4x24" dustless Belt Sand.	269	165
D100VR	3/8"VSR 0-1200 rpm drill	91	49
W640	7¼" 13 amp circular saw	158	99
W740	8¼" 13 amp circular saw	171	109
JS60	Jig Saw-Single Speed	172	99
JSE60	Jig Saw-electronic v/sped	198	123
R150	1 H.P. Plunge Router	138	86
R330	2 H.P. Router	220	138
R500	3 H.P. Router	265	163
E3800	Drywall screwdriver 0-4000	126	79
L120U	3 5/8" Planer	142	89
BD1020R	3/8" 2-spd Cordless Drill w/free holster-Xtra special buy	148	95
TS251U	10" Mitre Box	300	169
SG1150C	4½" H.D. Mini-Grinder	99	59

YOUR ATTENTION PLEASE!
All Above RYOBI TOOL Prices
Take Additional 10% OFF Sale Prices

MILWAUKEE TOOLS

		List	Sale
0224-1	3/8 drill 4.5A magnum	159	109
0234-1	1/2 drill 4.5A magnum	159	115
0244-1	1/2 drill 4.5A magnum	159	115
0222-1	3/8 drill 3.3A 0-100 rpm	146	99
0228-1	3/8 drill 3.3A 0-1000 rpm	129	95
0375-1	3/8 close quarter drill – NEW – 3.5 amp	175	118
0210-1	3/8 cordless drill – NEW – 2 speed	154	114
6539-1	cordless screwdriver – NEW – 190 RPM	84	64
1007-1	½" drill 4.5A D-Hdle	199	145
1107-1	½" drill 4.5A D-Hdle	204	145
3300-1	magnum rt angle drive kit	249	170
3102-1	Pimbrs rt angle drill kit	263	180
1676-1	HD Hole Hawg w/cse 2 sp	333	235
5395	3/8 sgle sp hammer drill kt	203	150
5397	3/8 var sp hammer drill kit	208	155
5371-1	HD mag. hammer drill ½"	287	207
5373	HD mag. ham. drill 3/8"	240	175
6511	2 speed Sawzall w/case	181	123
6226	port band saw 2 sp w/case	382	280
6234	TSC band saw port w/case	382	280
6365	7¼" circ. saw 13 amp	159	109
6405	8¼" circ. saw 13 amp	179	127
6460	10¼ " " 15 amp w/case	349	245
6377	7¼ HD worm saw 13 amp	235	155
6378	8¼ HD worm saw 13 amp	249	165
6165	12" Chop Saw 15 amp 4200 R.P.M.	267	189
6170	14" Chop Saw 15 amp 3600 R.P.M.	289	209
6255	v/sp Jig Saw 3.8 amp	199	140
6245	sgle sp Jig Saw 3.8 amp	175	125
6012	½ sheet HD Orb. sander	159	110
6014	½ sheet HD Orb. sander	169	115
5935	4" by 24" belt sander w/bag 10 amp	319	215
5660	1½ HP router 10 amp	256	175
5680	2 HP router 12 amp	314	220
8950	Wet/Dry 8 gal vac 6 amp	145	110

BENCH GRINDERS

4901	¼ HP 2.6 amp 24#	159	110
4921	½ HP 4 amp 26#	179	130
4891	½ HP 4 amp41#	279	195
5041	¾ HP 8.2 amp 58#	379	270

DRYWALL SHOOTERS

6753-1	3.5 amp 0-4000 rpm new	115	79
6747-1	4.5 amp 2500 rpm	144	100
6750-1	4.5 amp 0-4000 rpm	129	90

MILWAUKEE Super Specials!

Model 6507 Trigger Speed Control Sawzall w/case & blades .... List 193. ★ Sale 125.

Go Cordless with MILWAUKEE

#6305 – 6¼" Cordless Circular Saw
12 volt — 1 Hour Charge
Cuts (80) 2x4's (Pine)
List Price 195.00 ★ SALE PRICE 135.00

FREUD SAW BLADES

Univ. Bore — Professional Series
CARBIDE TIPPED SAWBLADES

Item No.	Description	Diam.	Teeth	List	Sale
PS203	Gen'l Purp.	7¼"	24	27.24	17.50
PS303	fine cutting	7¼"	40	32.97	20.50

5/8" Bore — Industrial Grade
CARBIDE TIPPED SAWBLADES

Item No.	Description	Diam.	Teeth	List	Sale
LU72M010	Gen'l Purp.	10"	40	68.58	34
LU81M010	Gen'l Purp.	10"	40	69.30	35
LU73M010	Cut-Off	10"	60	79.65	36
LU82M010	Cut-Off	10"	60	86.40	44
LU84M010	Combination	10"	40	70.99	36
LU84M011	Combination	10"	50	74.51	37
LU85M010	Super Cut-Off	10"	80	110.88	62
LM72M010	Ripping	10"	24	64.85	34
DS 306	6" Dado			139.00	92
DS 308	8" Dado			170.00	105
TR 100	3 blades & Dado set			399.00	255

FORSTNER BITS (ARCO)
West Germany

Model	Size	List	Sale
2121	1/4	6.40	4.00
2122	3/8	7.00	4.50
2123	1/2	7.80	5.00
2124	5/8	10.35	6.50
2125	3/4	10.95	7.00
2126	7/8	11.40	7.25
2127	1	12.25	7.75
2128	1-1/8	12.75	8.00
2129	1-1/4	13.85	8.75
2130	1-3/8	16.45	10.50
2131	1-1/2	18.15	11.00
2132	1-5/8	21.25	14.50
2133	1-3/4	23.95	16.50
2134	1-7/8	25.50	17.50
2135	2	26.25	18.25
2136	2-1/8	30.50	20.50

16 Pieces *(one of every size of above)*
List Price 254.80 ★ SALE PRICE 150.00
4 Pieces *(1/2 - 5/8 - 3/4 - 1")*
List Price 38.95 ★ SALE PRICE 25.00

MAKITA TOOLS

		List	Sale
B04510	Sander	79	43
9900B	3"x 21" belt sander	198	119
9924B	3"x 24" belt sander	188	135
9924DB	3"x 24" b/sand. w/bag	214	130
9035	½ sheet finish sander	79	48
9045B	½ sheet finish sander	156	90
9045N	½ " " "w/bag	158	105
4200N	4-3/8 circ. saw 7.5 amp	152	95
5008NB	8¼ circ. saw 13 amp	178	105
5201NA	10¼ circ. saw 12 amp	348	215
4300BV	v/sp jig saw 3.5 amp	192	120
4301BV	orb v/sp jig saw 3.5 amp	208	125
2401BW	10" mitre saw	329	185
2400BW	10" mitre saw (for vice)	389	249
JR3000WL	2 sp recip saw w/cse	168	120
JR3000V	vs recip saw w/case	178	120
6010DWK	3/8 cordless drill w/case	152	89
5081DW	3-3/8 cordless saw kit	165	109
1900BW	3¼" planer w/case	154	92
1100HD	3¼" planer w/case	278	160
3608BK	¾ hp router w/case	132	85
3601B	1-3/8 hp router	168	115
3700B	½ hp trimmer 28,000 rpm	124	82
B04530	6" Round Sander	84	55
6710DW	Cordless Screwdriver	148	105
DA3000	3/8" angle drill	158	105
DP4700	½ v/sp w/rev " 4.8 amp	154	92
HP1030W	3/8 v.s.r. hammer drill w/case	145	98
6300LR	½" angle drill w/rev	229	152
84198B-2W	½" 2 sp. hammer drill w/case	238	150
GV5000	Disc Sander	79	53
6800DB	2500 rpm 3.5 amp	123	79
6800DBV	0-2500 rpm 3.5 amp	133	89
6801DB	4000 rpm 3.5 amp	123	79
6801DBV	0-4000 rpm 3.5	133	89
2030n	12" planer/jointer	1980	1350
2040	15-5/8" planer	1780	1195
1805B	6-1/8" planer kit w/case	416	285
LS1400	14" Mitre Box	578	410

★ *NEW* from MAKITA! ★

Model		List	Sale
9820-2	Blade Sharpener	235	160
6802DWK	3/8" 2-sp c/less drill kit	154	94
6010SDW	3/8" cordless drill rev	82	45
DA3000DW	3/8" c/less angle drill	172	105
JV1600	var. speed jig saw	145	89
JV2000	var. speed orb. jig saw	165	100
4300DW	cordless jig saw	158	102
5005BA	5½" circular saw 8 amp. with brake	154	98
5600DW	6¼ c/less circ/saw	224	139
9207SPC	7" var/speed elecronic sander/polisher	209	130
9303BH	4½" sander-grinder kit	146	95
9035DW	c/less finishing sander	128	78
4014NV	var/speed blower	128	79

DELTA

		List	Sale
34-821	9" contr. saw w/o motor	500	395
34-410	10" contr. saw w/o motor	871	650
34-710	super 10" motorized saw	579	450
15-091	15" floor model D/press	487	375
15-090	15" bench model "	487	375
37-207	Saw/Jointer Combination	1018	810
37-609	6" Motorized Jointer	413	335
37-290	4" deluxe Joiner w/o motor	348	275
22-851	RC-33 — 13" Planer	1943	1450
43-122	Wood Shaper w/stand and 1 HP Motor	669	495
46-140	11" lathe, gap bed model w/stand w/o motor	407	335
52-493	1 hp motor for #34-621	170	130
62-042	1¼ hp motor for #34-410	230	170
62-144	½ hp motor for #37-290	138	105
62-142	½ hp motor for #28-243 and #46-140	121	85

1985 TOOL CATALOG AVAILABLE
Call Toll-Free 1-800-328-0457 – In Minnesota Call (612) 224-4859
4 WAYS TO BUY: CHECK – MONEY ORDER – VISA – MASTERCARD
SEVEN CORNERS ACE HDW. Inc.
216 West 7th St. • St. Paul, MN 55102 • *Est. 1933*

SAW-A-THON by PORTER CABLE

#314	4½" trim saw	List 180 ..... SALE 109
#348-1	6½" top hdle	List 161 ..... SALE 100
#617	7¼" Push Hdle	List 166 ..... SALE 103
#587	7¼" Speedtronic	List 199 ..... SALE 125
#315-1	7¼" Top Hdle	List 166 ..... SALE 103
#368-1	8¼ Top Hdle	List 176 ..... SALE 110

DELTA *SUPER SPECIALS!*

#33-150	SAWBUCK	List 858 ..... SALE 499
#28-560	BANDSAW 3 wheel	List 449 ..... SALE 349

#28-283 14" Band Saw with enclosed Stand and 3/4 hp Motor
List $897.00
Sale $675.00

#28-243 14" Band Saw with Open Stand without Motor
List $594.00
Sale $440.00

#22-651 13" Planer
List $1943.00
Sale $1295.00

TOOLS ON SALE™
AMERICA'S LOWEST PRICED TOOLS
★ PLUS ★ ... *FREE* ... Freight On Every Item

SUPER CORDLESS SPECIALS from BLACK & DECKER

Model	DRILL KITS	List	Sale
1930	3/8" rev/ hi speed	165	110
1950	3/8" High Torque	165	110
5930	Reversible Hammer	179	120
1970	3/8 rev/hi torque screwdriver	179	120
1980	Rev/ adj. clutch Scrudrill	179	120

BRAND NEW! SUPER SPECIALS from MILWAUKEE

0214-1	3/8" c/less driver/drill	154	109
8975	H.D. Heat Gun, 11.6A Low 570°F - High 1000°F	69	49
5920	belt sander 3x24 w/o bag	289	199
5925	belt sander 3x24 w/bag	309	215
5930	belt sander 4x24 w/o bag	299	209
5935	belt sander 4x24 w/bag	319	225

BRAND NEW! BLACK & DECKER

#9425 8¼" Compound Mitre Saw
Special Sale Price — $115.00

PORTER-CABLE *(buy of the year)*

Model 821 REVERSING DRILL
3/8" H.D. var/speed-4 amp 0-1000 rpm
List 120 ..... SALE 72
6 or more $69.00 each

★★ *ROUTER RIOT* ★★ by PORTER-CABLE

Model		List	Sale
100	7/7 H.P. 6.5 amp	134	86
630	1 H.P. 6.8 amp	145	95
690	1½ H.P. 8 amp	189	125
691	1½ H.P. D-Hdle 8 amp	213	135
536	1½ H.P. Speedmatic Double Handle	295	185
537	1½ H.P. Speedmatic Double Handle	310	210
520	3 H.P. Production	435	275
518	3 H.P. Micropressor 5-sp	475	310

TRIMMERS by PORTER-CABLE

309	3.8 amp laminate trimer	120	78
310	3.8 amp laminate trimmer	180	120
312	offset base laminate trim	195	130
319	tilt-base laminate trim	205	135

★ *X-TRA SPECIALS* ★

MAKITA TOOLS

		List	Sale
6010DL	C/less Drill w/flashlight charger & case	162	90
DP3720	3/8 drill Rev. 0-1800 rpm	90	47
6510LVR	3/8 drill Rev. 0-1050 rpm	116	67
6013BR	1/2" Drill Rev. 6 amp.	174	100
5402A	16" Circular Saw-12 amp	468	315
2414	14" Cut Off Saw-13 amp	282	169
3612BR	3 HP Plunge Router	286	175
9401	4x24 belt Sander w/bag	248	160

PORTER-CABLE

		List	Sale
696	H.D. Shaper Table	150	105
695	H.D. 1½ hp Router/Shaper	278	190
399	Drywall Cut-Out Unit	100	70
736	V/Speed *Speedtronic* Band Saw	450	330
7564	½ " X.H.D. Drill 8 amp	205	145

BOSCH TOOLS

		List	Sale
1581VS	Top Handle Jig Saw	225	126
1582VS	Barrel Grip Jig Saw	126	118
1604	1¾ H.P. Router	199	110
1942	Heat Gun 650° — 900°	99	65
1272	3x24" Belt Sander	259	159
1272D	3x24" Belt Sander w/bag	274	169
1273	4x24" Belt Sander	274	169
1273D	4x24" belt sander w/bag	289	179

DELTA

		List	Sale
34-010	Motorized Mitre Box	231	149

★ NEW LOW PRICES ★ PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
#50	for ¾" Black Pipe	11.23	7.40	80.00
#52	for ½" Black Pipe	9.38	6.10	67.50

JORGENSEN HAND SCREWS

Model	Jaw Length	Open Cap.	List	Sale	Box of 6
#5/0	4"	2"	11.59	7.25	39.15
#4/0	5"	2½"	12.45	8.10	43.75
#3/0	6"	3"	13.35	8.50	45.95
#2/0	7"	3½"	14.35	8.95	48.35
#0	8"	4½"	15.97	9.95	53.75
#1	10"	6"	18.25	11.35	61.25
#2	12"	8½"	20.94	13.50	72.95
#3	14"	10"	28.56	18.75	91.35
#4	16"	12"	34.55	23.75	128.25

JORGENSEN BAR CLAMPS
STYLE 37 — 2½" Throat 1/4" x 3/4"

Model	Jaw Length	List	Sale	Lots of 6
#3706	6"	7.88	5.50	29.70
#3712	12"	8.73	5.95	32.13
#3718	18"	9.84	6.95	37.53
#3724	24"	10.54	7.35	39.69
#3730	30"	11.78	8.25	44.55
#3736	36"	12.85	8.95	48.33

Who Has The Saws That Cut It Across The Board?

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3052	8¼" 13 amp - 4300 rpm	247	169
	SUPER SAWCATS		
3047-09	7¼" w/brake - 12.5 amp	226	149
3048-09	8¼" w/brake - 13 amp	240	155
	BUILDERS SAW CAT		
3030	7¼" 13 amp - 5800 rpm	155	100
3035	8¼" 13 amp - 5800 rpm	175	125
3034	7¼" 13 amp - 5800 rpm	162	115
3033	6½" 13 amp - 5800 rpm	162	115
	JIG SAWS		
3157-10	var/sp orb action d/hdle	174	115
3153-10	var/speed 4.5A 0-3100	158	105
3159-10	2/sp orb action barrel grip	178	120
	CUT SAW KITS		
3103	2 sp 6 amp-2400 strokes	163	100
3105	V/Sp 6 amp-2300 strokes	170	110
3107	V/Sp orb 6A 0-2300 strokes	183	119
4300	Drill Bit Sharpener	299	205
1321	½" drill 450 rpm 6 amp	175	115
4010	Palm Sander	80	48
4015	½ Sheet Finish Sander	160	105
	DRYWALL GUNS		
2034	v.s.r. 0-4000 rpm	121	79
2037	v.s.r. 0-4000 rpm	139	89

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9501B	4" Grinder Kit	119	55
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648	HD s/s bayonet saw 3 amp	255	169
9627	2 sp. tiger saw kit 8 amp	183	118
505	H.D. ½ sheet finish/sander	165	103
330	spd bloc sander ¼ sheet sz	87	54
304	Professional 7" disc sander	160	105
305	Professional 7" polisher	160	105
7511	3/8"xtra hvy v/s drill 5.2 amp	154	100
7554	½" xtra heavy drill 8 amp	205	135
309	3.8 amp laminate trimmer	120	80
310	3.8 amp laminate trimmer	180	130
312	offset base laminate trim.	195	135
319	tilt base laminate trimmer	205	140
167	block plane 2.5 amp	129	86
9652	Versa-Plane Kit	419	285
9118	Porta Plane Kit	289	195
97650	½" dual range var/speed hammer/drill kit w/case	201	130
	DRYWALL SHOOTERS		
7544	5.2 amp — 2500 r.p.m.	154	100
7545	5.2 amp — 0-2500 r.p.m.	154	100
7546	5.2 amp — 4000 r.p.m.	149	100

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387	6½" Worm Saw	239	149
825	8¼" Worm Saw	270	185
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33-425	PL-425 1" x 25' Rule	18.95	8.95
33-430	PL 430 1" x 30' Rule	20.95	9.95

Continued from page 28

Gaining the edge

"Breaking" the sharp edges of a project makes it safer and more finished looking. This radius plane has two high-carbon cutters: The first makes the cut, while the second finishes the edge. Both cutters are adjustable for radius (1/16" to 1/4") and centering. The plane is built to last, too—the body is solid rock maple, and the soleplate is brass. *Radi-Plane with a pair of replacement blades. $30.85 postpaid from Leichtung, Inc., Dept. W, 4944 Commerce Parkway, Cleveland, OH 44128.*

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Sand to the sound of a different drum with this flexible sander. Designed for speeds up to 3,700 r.p.m., this tool fits any drill, drill press, or lathe with a 3/8" chuck. Use the sander fully inflated for fast work on flat surfaces or partially inflated for contours. A hand air pump and four sanding belts with grits of 40, 80, 120, and 180—or four belts with the same grits—are included with each unit. *Air Drum Sander. $36.50 postpaid from Tri-Mex Industrial, Dept. W, Route 11, Mooers, NY 12958.*

Continued

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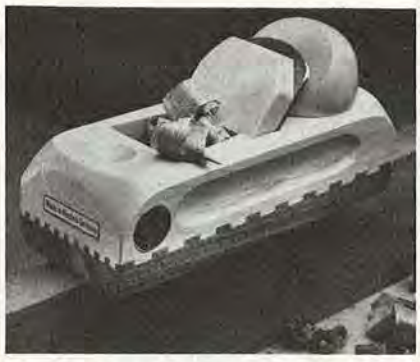
PRODUCTS THAT PERFORM

Continued

All-around sanding tools

The trickiest part of using sandpaper-covered dowels in those hard-to-reach curves is keeping them from loading up with particles—or wearing out when you're *almost* finished. These sanding tools solve those problems with abrasive surfaces of tungsten-carbide grit brazed to a steel backing. The tools feature fine grit on one side and coarse grit on the other. *Perma-Grit Sanding Tools. ⅛", $6.95; ¼", $6.95; ⅜", $8.25—all postpaid. We obtained ours from MicroMark, Dept. W, P.O. Box 5112-100, 24 E. Main St., Clinton, NJ 08809.*



Fine block plane at a bargain-basement price

The craftsmanship and feel of this wedged block plane would convince most woodworkers to add one to their shop, but the $11.95 price makes it an unbeatable value. This tool works as well as it looks, combining a lightweight beech body with an extra-hard lignum vitae sole. The tool is just 6" long with a 1½" blade—small enough to fit in one hand, but wide enough for jobs ranging from general trimming to end grain planing. *Wedged Block Plane. $11.95 postpaid from Fine Tool Shops, Inc., Dept. W, 20 Backus Ave., Danbury, CT 06810.*

A turn for the better

Here's relief for victims of wristlash: This line of three ratchet screwdrivers was designed to take the work out of projects that require multiple fastening operations. The large handle on each tool fits your fist for maximum comfort and torque, and the three-position drive switch lets you drive, loosen, or lock the shaft for use as a regular screwdriver.

The small set (shown above) includes the tool, five screwdriver bits, and storage case. The medium version adds a socket adapter and seven standard sockets; the large set includes everything in the medium set, plus seven metric sockets and five TORX bits. *Stanley Workmaster Ratchet Screwdrivers. Six-piece set about $16; 14-piece set about $22; 26-piece set about $30. Available at hardware outlets nationwide.*

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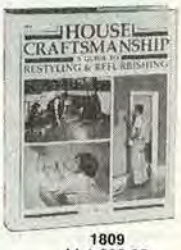

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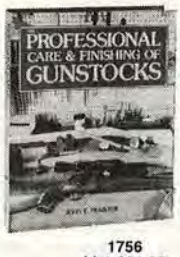

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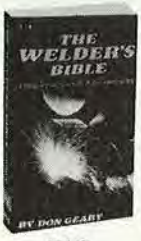

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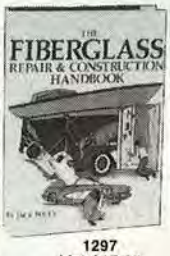

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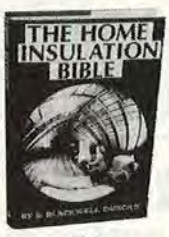

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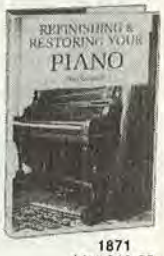
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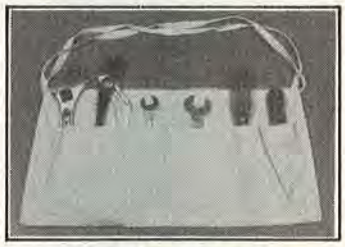
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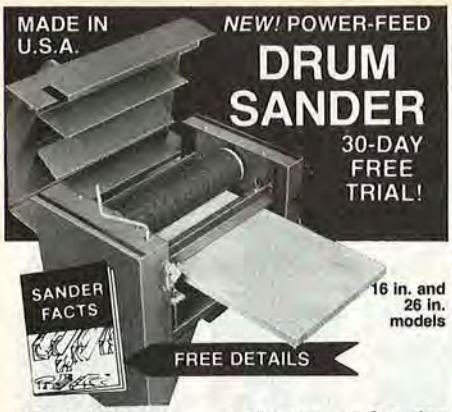

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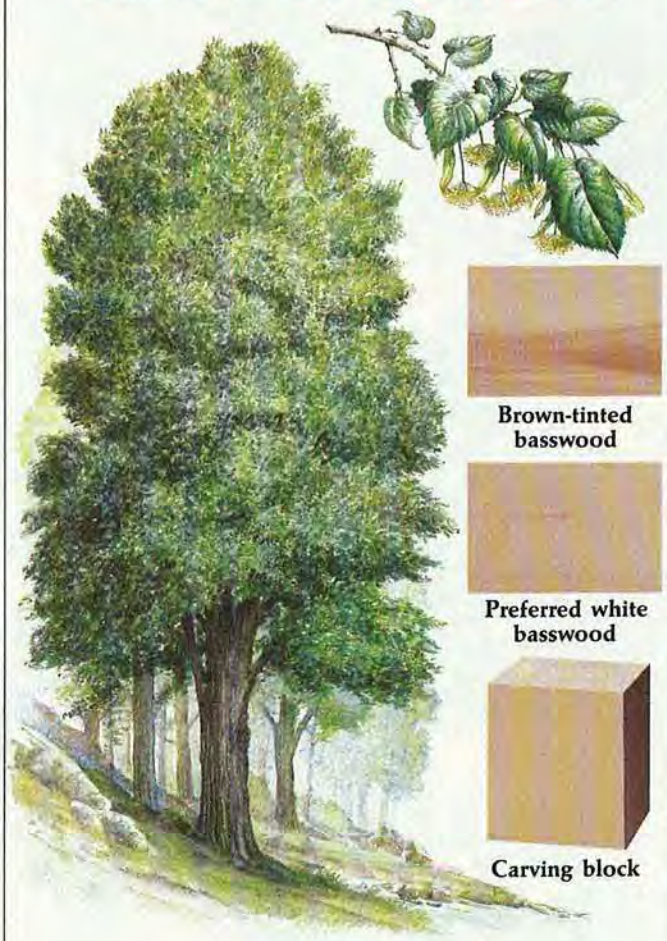
BASSWOOD

"How sweet it is!" agree carvers and honeybees

Today's carvers rate basswood highly, but it was probably the Iroquois Indians who first discovered this wood's adaptability to the knife. America's settlers found Indian braves carving ceremonial masks on living basswood trees, then splitting them off from the trunk for hollowing. In the process, the Indians saved the innermost bark fibers for fishnets, mats, and cord.

Basswood, also called linden in Europe and parts of the U.S., provides more than quality carving wood, however. Oil from the blossoms of a European variety are an ingredient in perfume, while in America, honey from basswood's sweet flower nectar tingles taste buds. Even the boxes used to ship honeycomb are made of basswood because it imparts neither odor nor taste.

And, if you've ever picked berries in little baskets or received a free wooden yardstick from a lumberyard or hardware store, you probably unknowingly became acquainted with basswood, the source of many of these items.



Wood identification

Among the several basswood species in North America, only *Tilia americana* is commercially important and desirable for woodworking and carving. It grows from Maine to South Dakota and southward through Tennessee and northern Texas. But the Lake Superior area boasts the largest concentration of marketable timber.

A symmetrical tree, basswood reaches heights of 90′ and has distinctive, large, heart-shaped leaves that make it a favorite for city shade plantings. The largest trees grow in the wild, along stream banks. In June and July, white flowers decorate its branches.

Older specimens have deeply ridged, dark gray bark about 1″ thick. The bark of young trees appears lighter in color, smoother, and thinner.

The wood's color ranges from white to creamy white, often containing brown when taken near the center of the tree. Sometimes the wood has bluish mineral streaks, which many find objectionable.

Light in weight at 26 lbs. per cubic foot dry, basswood has fine, consistent grain, yet you can dent it with your fingernail. Stable when dry, it shrinks considerably during seasoning.

Working properties

As a carving wood, basswood ranks premier because it won't easily chip or break off ahead of the knife—attributes more apparent in slow-growing northern stock.

You'll have no difficulty working basswood with hand or power tools; it sands, glues, and accepts paint exceptionally well. Its fine grain and fibrous cell structure make it hard to stain.

Uses in woodworking

Because basswood holds detail without splitting or breaking, carvers find it perfect for relief work, caricatures, and other carvings with intricate cuts. While most woodworkers don't realize it, basswood can be used for drawer construction, hidden furniture parts, and as a substrate for veneering. It also turns quite well.

Parents looking for a wood easy for children to work should consider basswood, since it drills and finishes so effortlessly.

Cost and availability

Generally available at hardwood outlets and through mail order suppliers, basswood costs about $1 less per board foot than oak.

Boards may be up to 12″ wide and 12′ long, but smaller sizes are more prevalent. Carving blocks come in 2″ to 4″ thicknesses. Veneers are rare.

Photographs: Hopkins Associates
Illustration: Steve Schindler

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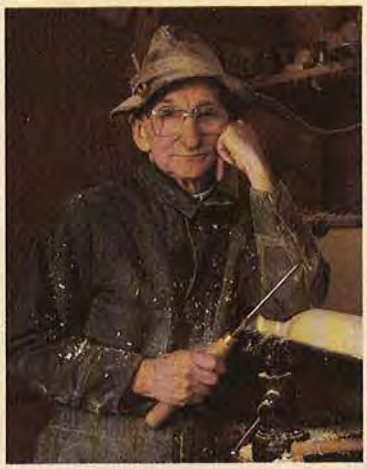
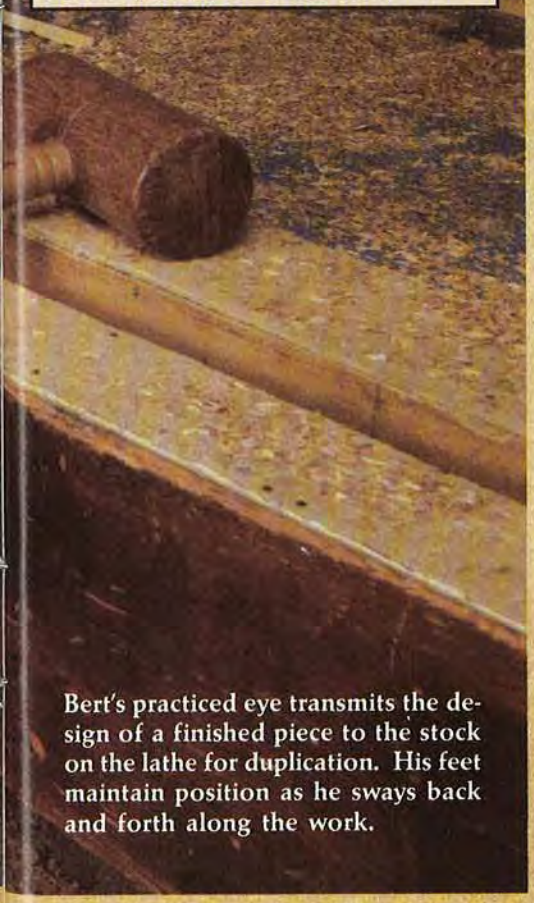
Secrets of a Production Turner

Canadian Bert Thompson shares wood-turning techniques his dad taught him and his grandfather taught his dad.



Bert Thompson, 70, has operated his commercial wood-turning shop in Mississauga, Ontario, since 1940. Before that he worked for others—turning wooden pulleys, chess sets, trays, and at one time, even the wooden centers for discuses. On his own, the bulk of his work came and continues to come from builders and furniture manufacturers.

Besides his commercial work, Bert teaches turning. At his shop, students receive one-on-one training. Bert also travels outside Canada for sessions. May, his wife, shares his active life.



Bert's practiced eye transmits the design of a finished piece to the stock on the lathe for duplication. His feet maintain position as he sways back and forth along the work.

Passersby on the busy street fail to notice the sign on the once-white workshop behind the house that says "Wood Turning." Knowing tradesmen, however, often pull in to drop off wood to be turned on his huge, swirling lathe. The work they pay for, they've come to expect, will be exactly as ordered.

Bert Thompson does what's ordered, to specification, for he's learned that builders and furniture makers won't tolerate incompetence. "They'll give you six pieces of wood and want six back," he states.

His skill makes him confident, however, for he's based it on 155 years of wood-turning tradition. Bert has been a professional production turner for more than 50 years. He learned from his father what had been handed down from his grandfather—closely guarded turning techniques that date to 1830 when the elder Thompson settled in Oshawa, Ontario, and began making piano legs in a factory.

At 70, Bert claims to be the "youngest" production woodturner in Canada. Before he becomes the oldest, he wants to share and teach those willing to learn the proven methods passed on to him.

Real turners never scrape

His father, who could still turn at the lathe when he was 90, once turned a column 4′ in diameter and 54′ long. Bert says the column, "staved up like a barrel," could hold four men inside. His father told him that in those days there were many good turners.

"You could look at a piece of wood and know who turned it," relates Bert, "because every professional turner left his trademark the same as Raphael and other artists. You could tell by the cuts."

You don't, however, have to see a turner's work to know how good he is. According to Bert, you can look under the bench when he goes home. "If you see lots of sawdust, he's a wood scraper. Piles of curly shavings, though, show he's a wood*turner.* A good woodturner never scrapes—that's a sin!

"Only shearing (cutting) is wood turning," emphasizes the compact, wiry Bert, as he brushes a maple curl from his coveralls. "I know you can scrape something, then sand, and it will look all right. But if you turned it, it would be finished in half the time."

Sanding, he admits, is OK once in awhile, "because some woods don't have an even texture after turning." Shiny spots and dull spots on the same piece of wood means it won't take stain uniformly, so a light sanding becomes necessary.

Bert likes to describe his turned pieces as "smooth as satin." Indeed, if you rubbed your hand across any of the newel posts, spindles, columns, balusters, or chair and table legs stacked around his workshop, you couldn't argue the point.

Start with a vibration-free lathe

Bert's lathe dominates his shop, as it would any space. The Clark de Mille model he uses was made before the turn of the century. It still has its original bearings. And the bed it rests on occupies an entire wall.

Long enough to span 22′ between centers, the bed was made by Bert 35 years ago of "British Columbia fir that will never wear out." Its 3×8″ legs are sunk 4′ in the ground and the back of the 4×10″ bed timbers bolt to the building. Understandably, the lathe transfers no vibration.

Continued

Lathe speed also plays a significant role in Bert's production turning. "Most turners turn too slow," he claims. Pieces less than 2" in diameter, Bert turns at 2,500 to 2,800 r.p.m. Up to 6" work rates a slowdown to about 1,750 r.p.m. Larger turnings spin at 1,000 r.p.m. or less (depending on the diameter), like the 14" diameter, 18' long columns he turned for a local contractor some years back. They required a special reduction pulley to get speed down to 400 revolutions.

Tools that cut and last for decades

You can't ask this turner for advice on which turning tools to buy. He's always made his own.

"In my opinion, not one manufacturer makes a proper tool. When I want or need one, I make it, and it will last for 60 years," offers Bert.

"I don't find it necessary to use high-speed tool steel. If I shear with a tool, the edge will stay sharp. If you scrape with a tool, the steel has to be much, much harder so it won't burn."

To shear, tools have to be sharp, and Bert has found the only way to sharpen a shearing tool is to hollow-grind it. "A hollow-ground tool hugs the wood, a flat surface lays on the wood," he points out. "Therefore, a hollow-ground tool takes off more wood because there is more metal on the wood."

Knowing how to hollow-grind (see photo and drawing, *below*) involves more than the angle put on the end of the tool. Bert advises using a 7" medium-grit wheel 1" wide because "air bubbles trapped in the grit of the stone keep the tool cool as it's sharpened."

And never grind fast. "Don't exceed the speed at which your motor was designed to operate," Bert recommends, "or you'll run too fast. The air won't have a chance to cool the steel, and it will burn." His wheel runs at 1,725 r.p.m.

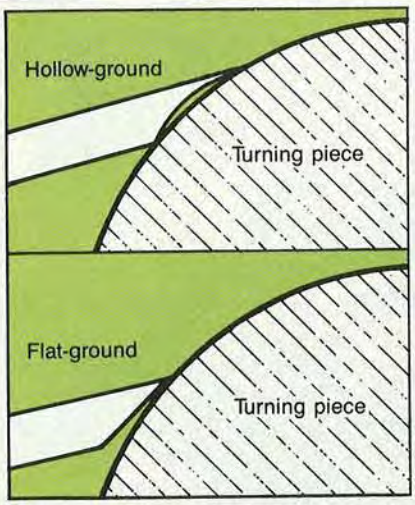
How can you tell when the tool becomes sharp? "When you see sparks coming over and across the tip evenly," Bert says.

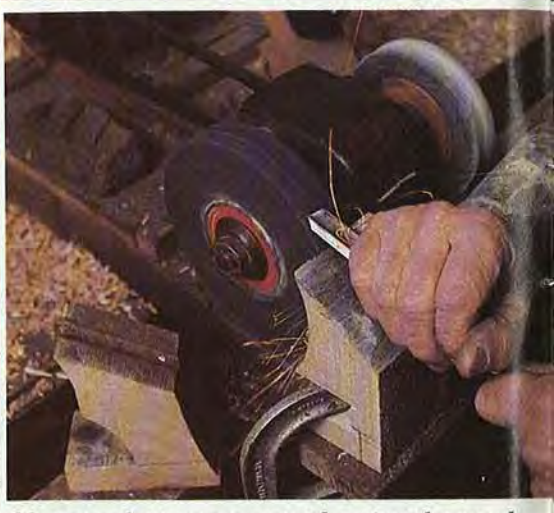
Too many tools slow you down

Three tools—a large gouge, a small gouge, and a parting tool shown in the photo, *right*—do 99 percent of Bert's turning. He rarely uses a skew. Instead, his 1"-wide roughing gouge has a flattened side to smooth. "You save time by not using other tools," he explains.

In this turner's world of time and precision, handles make a difference, too. Bert has no use for "long and strong" handles: "That means long and stupid. If you turn right, you don't need the leverage long handles give you."

Handles must fit your hand or they're of no use at all in his opinion. "They're a very personal thing,



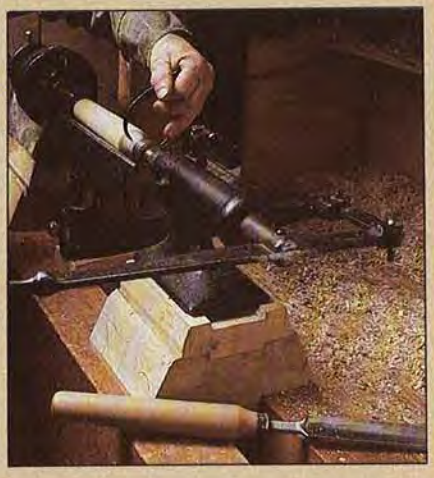


Hollow-ground tools take off more wood because they put more metal against the wood. Sharp shearing on the lathe results from such tools. The block sets the angle.

MAKE YOUR OWN TOOL HANDLES

Bert uses ash to make tool handles like this. His are 9" long "for even the largest tools" and large enough in diameter "so your fingers won't meet the palm of your hand" when you close around it.

On the lathe, he tapers the end into which the steel will be inserted to ¾" so it fits the ferrule (he fashions them of ¾" i.d. galvanized pipe and other materials). "Don't bother to put a finish on the handle because that just makes it slippery to hang onto," advises Bert. "Let them weather. Be sure to get them smooth first, however."



BERT THOMPSON'S TRIED-AND-TRUE CENTER FINDER

"You can't buy a decent center finder," Bert states. But you can make one like his.

To find the center of turning stock, loosen the wing nut so the top piece slides. Position the top on the stock at what looks like the center, then push the base up against the wood and tighten the wing nut. Now, mark a pencil line from each side of the wood with the finder (see photo, *right*). The resulting square between the lines will be the center. For round stock, use the "V" of the base against the wood.

A large gouge, small gouge, and a modified parting tool that can act as a skew are the only tools Bert really needs for between-centers turning.

made to fit you, not someone else." That's why Bert makes all his tool handles himself (see box, *opposite page*).

How you stand makes a difference

At least once a week, Bert likes to go dancing. But when he talks about the "woodturner's sway," it's not the one he does to music.

"Until you learn it, you can't turn," he says, his relish in showing how it's done breaking his expression to a grin.

Bert's an underhand turner—the steel rests and balances in the palm of his left hand and slides along the steady rest while the right hand slightly guides the handle. He insists that underhand is the only way to turn, but the sway has to accompany it, since footwork maintains your proper position to the spinning work on the lathe.

"You could call it 'sea legs.' Your feet never move, but your body does," he says as he shifts his feet into position among the wooden ringlets covering the workshop floor. "If you imagine a clock face, your left foot should be at half-past ten, your right at half-past four. You must keep your heels on the ground but your weight on the balls of your feet. Then, you can move along the work."

Combine the sway with the steadiness provided by tucked-in elbows and you'll be able to shear smoothly in the Thompson tradition. "Every move must have a follow-through—not too quick or too slow," Bert cautions. "It doesn't take much movement to put a ridge on the wood. And, if you make one mistake, it's ruined."

Woodturners can always work

Compared to the days when Bert had a half-dozen men working for him, today things are slow. He now turns alone, yet believes he could make $200 a day every day of the week, if he wanted to. Even with today's competition from high-tech machinery, which produces hundreds of turnings per shift, Bert thinks a good woodturner could still make a living.

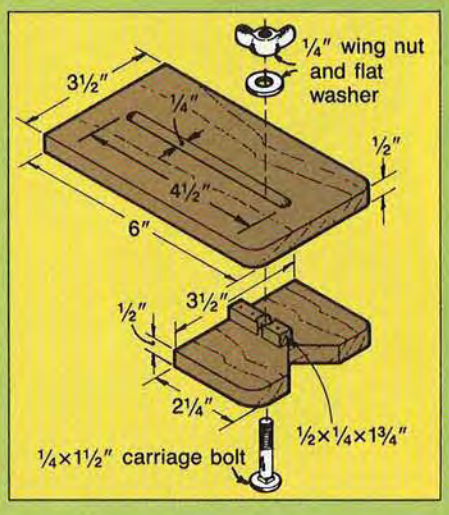
"There will always be work for the hand woodturner because machines can't be automated to turn only one or a dozen pieces," he states. "A woodturner needs only his lathe and no one needs to work for him. He can do it all alone."

Bert sees a future in woodturning, not only because he loves it, but because he doesn't want the skill to become history. To preserve it, he began his Canadian School of Woodturning several years ago so he could pass on the techniques.

"You can learn to scratch, and scrape, and sand, but that is not wood-turning. You cannot learn it by yourself. You have to be taught to be good," says Bert.

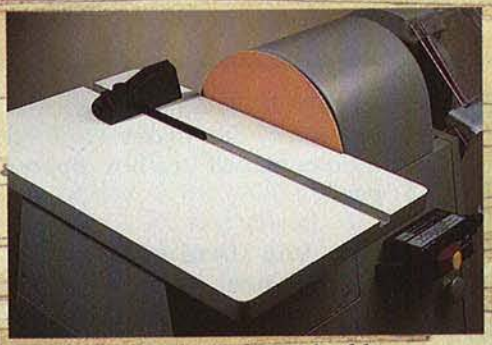
MORE OF BERT THOMPSON'S TURNING WISDOM

- "Before you turn a piece of wood, bounce it off the floor. If it doesn't bounce, it has a crack in it and could break your nose."
- "Your steady rest must have a 20- to 30-degree angle to the wood so the tool can shear."
- "The lathe center should be elbow height to get the proper angle for taking off wood."
- "If you must use work lights, position them between you and the work. Daylight is best."
- "Take the stone to every new tool and bevel its edge so it will slide along the steady rest."
- "A solid piece is more likely to warp than if you cut it in half, reverse the grain, and glue it back together. Then one side fights the other and it stays straighter."
- "If you turn a lot of hardwoods, shorten the grind on your tools so they don't heat up as fast."

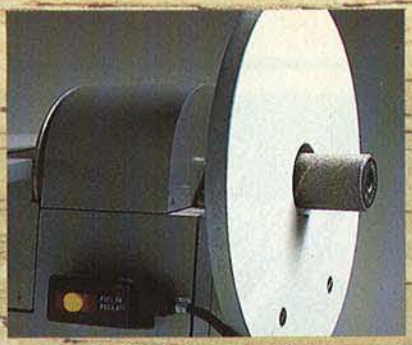


Produced by Peter J. Stephano
Photographs: James Eager
Illustrations: Bill Zaun

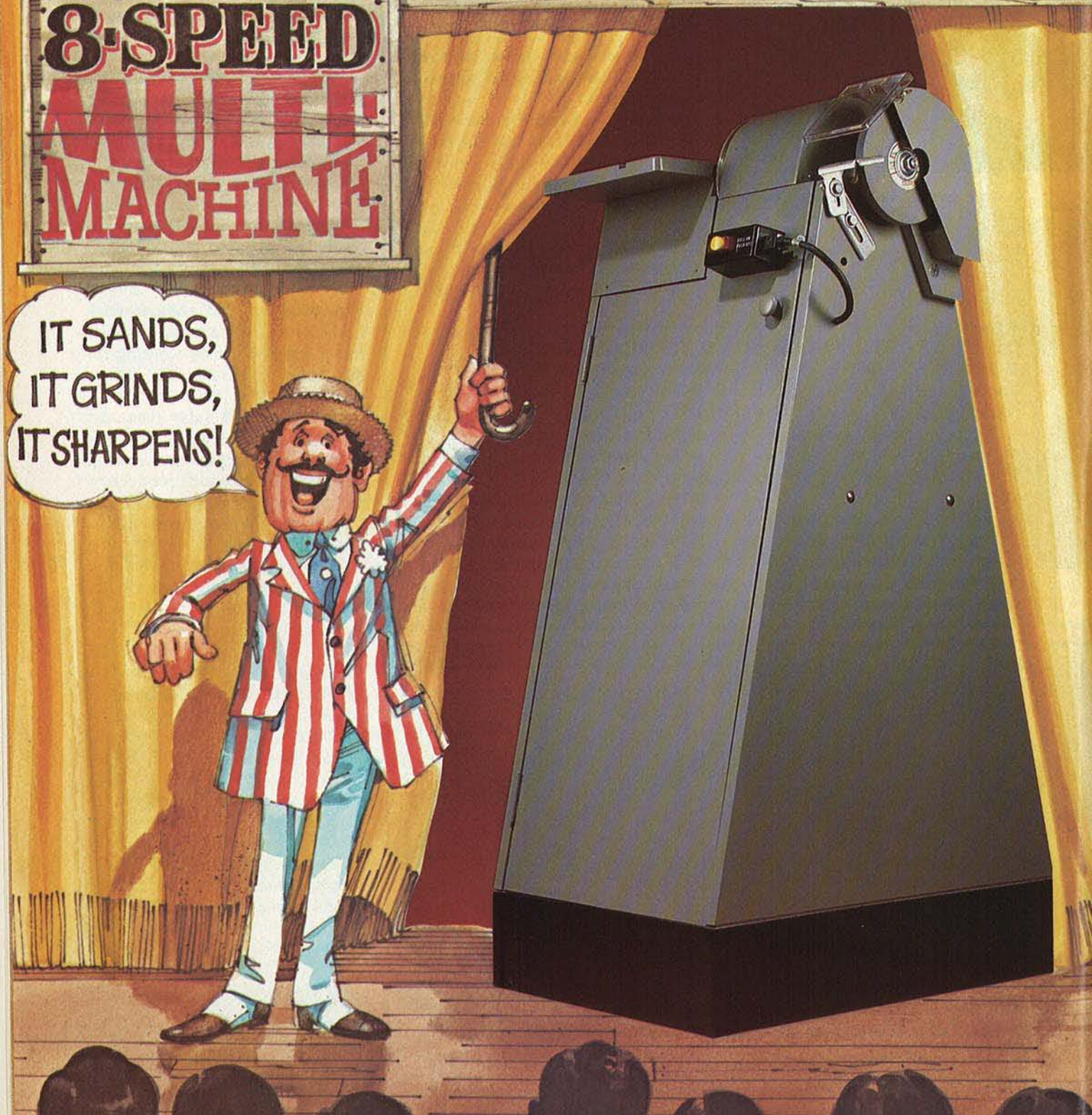
INTRODUCING THE AMAZING 8-SPEED MULTI-MACHINE



Disk sander and table

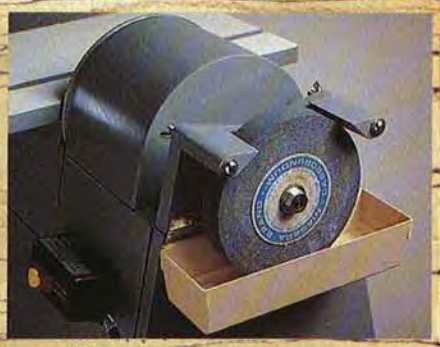


Vertical drum sander



Drill chuck with pneumatic sander

Grinder with tool rest and guard



Wet sharpening attachment

Print this article

Even the term "multi-use" doesn't do justice to this incredibly hard-working homemade tool. With the accessories shown in these photos, you can disk-sand, drum-sand, and sharpen with a wetstone or grinding wheel. If that's not enough, you can mount a drill chuck to contour-sand with either a flap sander or inflatable-drum sander, or clean rust with a wire-brush wheel. The drill chuck allows you to add several accessories only suited to a drill before. And to top it off, this workshop jack-of-all-trades lets you choose from eight different speeds for just the right r.p.m.'s to do the job properly.

We show you how to construct the cabinet and disk-sanding table in this article, and where to buy the mechanical components. In the next issue of *WOOD*, we'll tell you how to build the add-ons and where to buy the accessories.

BUILDING THE CABINET

1 Rip, then crosscut base frame parts A and B to size from 2×6 stock. Glue and butt-join the parts as shown in the Exploded-View Drawing, using #8×3″ screws and checking for square. (For better adhesion when joining end grain to face grain, we rub a coat of glue into the porous end grain first, wait a minute, and give it a second coat. Then we coat the surface grain of the mating piece and clamp the pieces together.)

Note: See the Buying Guide on page 85 for the details about mechanical parts. Because some mechanical components vary in mounting-hole spacing and size, we recommend buying all the parts beforehand.

Also, note that to protect the exposed edges of the plywood panels used in this project, we cut and glued ⅛″-thick birch banding strips to them. Dimensions given in the Bill of Materials and drawings include edge banding.

2 Cut two plywood rectangles for the cabinet's side panels (C). Using double-face tape, stick the panels together and cut them to shape as dimensioned in the Exploded-View Drawing (this ensures two perfectly matched panels). Cut 4″ off the top of the left panel to a finished height of 37″.

3 Rout the decorative ⅛″ vein ⅛″ deep 5″ up from the bottom of both sides. (The vein will match the slight gap between the base and the cabinet door.)

4 Glue and screw the side panels to the base frame as shown in the Exploded-View Drawing. (The panels will extend ¾″ beyond each end of the frame.)

5 Cut the center divider (D) and outboard shelf (E) to size as listed in

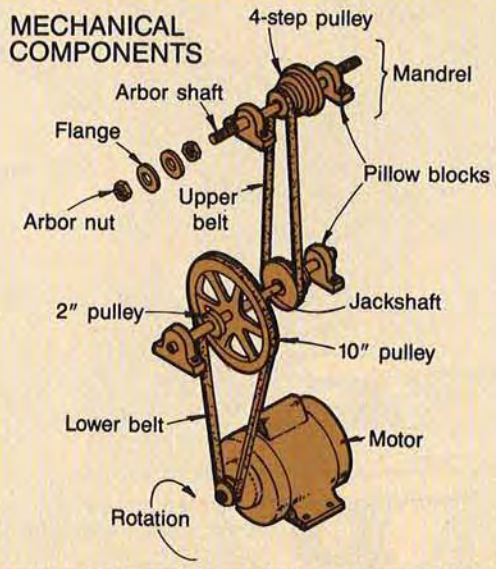
Instructions continued on page 44

DESIGN NOTES

An arbor shaft, which is the heart of our multi-machine, has many uses in the shop. We've long thought the arbor shaft could accomplish even more tasks—if we could only adjust the speed to suit the job. Our multi-machine does just that. Here's how it works and what the terminology in the drawing at *right* means:

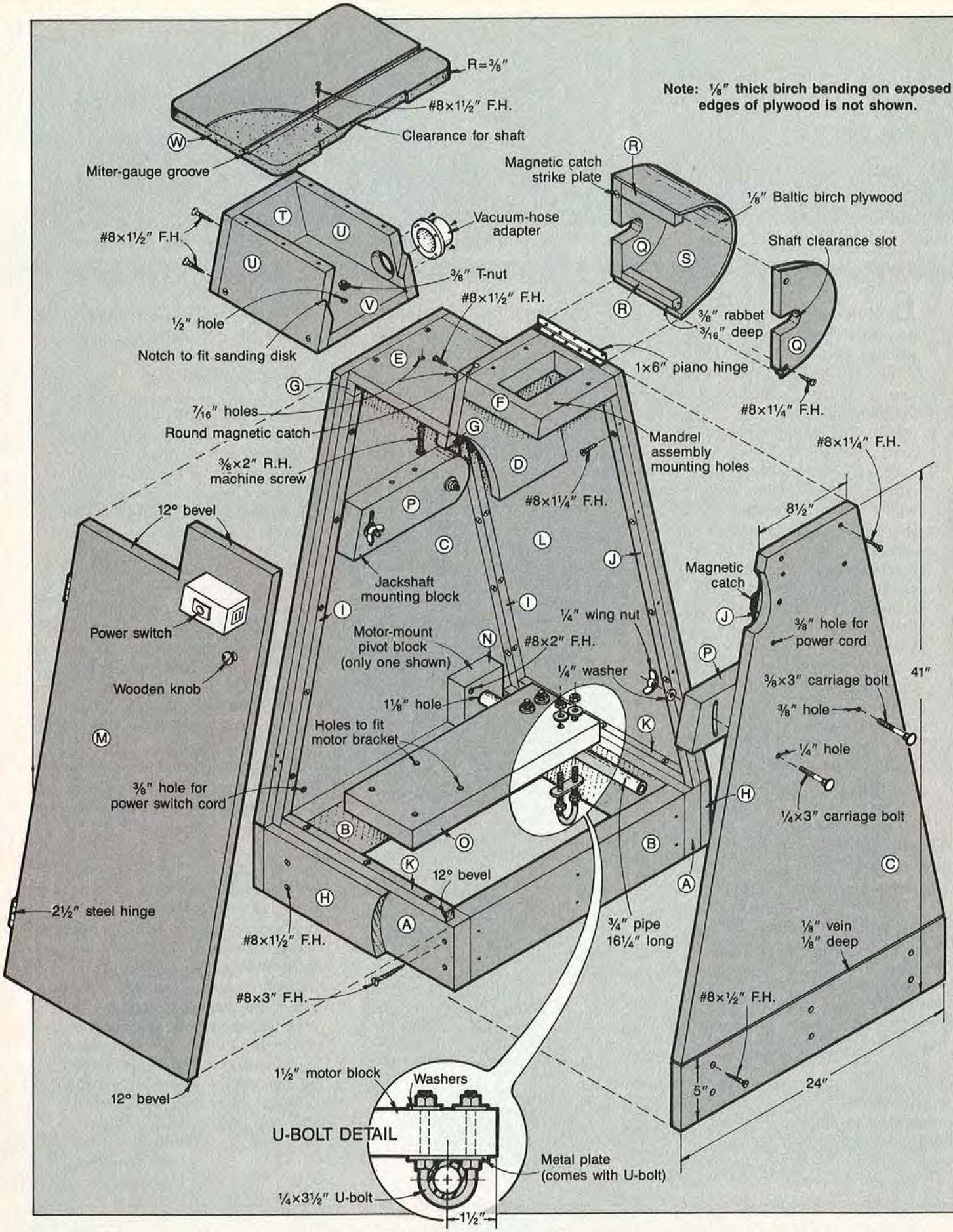
A *mandrel* consists of an *arbor shaft* with threaded ends supported by two *pillow blocks*. Accessories are held in position on the arbor shaft by *arbor nuts* and *flanges*.

To reduce the speed of the arbor shaft to do low-speed work, we had to use a *jackshaft*, also supported by two *pillow blocks*.

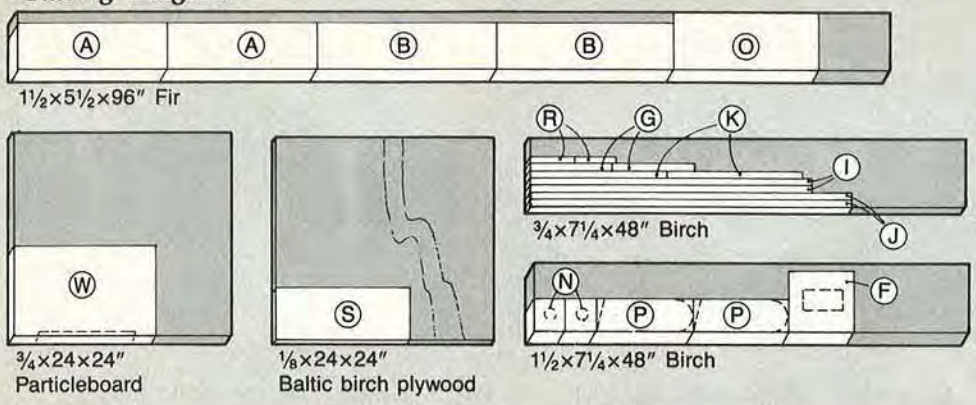


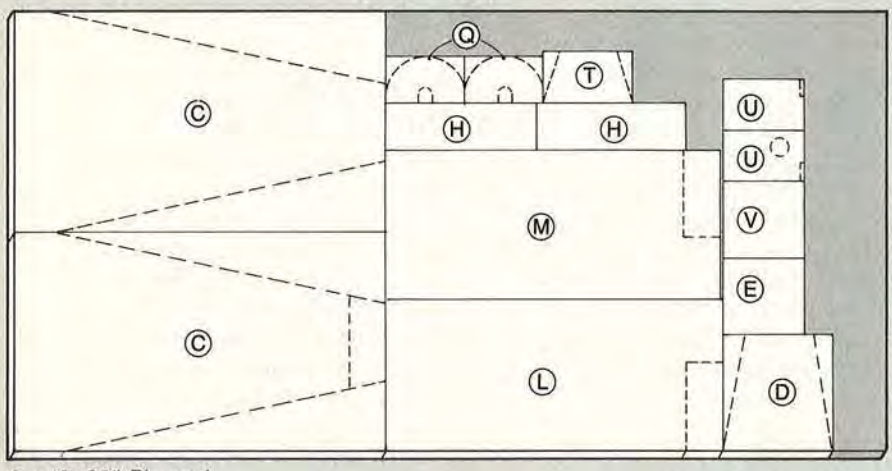
You can drive the jackshaft at two speeds: high and low. High speed is attained by running the *lower belt* from the *motor* to the *2″ pulley* on the jackshaft. You can reduce the jackshaft speed by running the lower belt from the motor to the *10″ pulley*. The arbor-shaft speed can be reduced even further by running the *upper belt* on the smallest pulley of the jackshaft *four-step pulley* and the largest pulley on the arbor shaft.

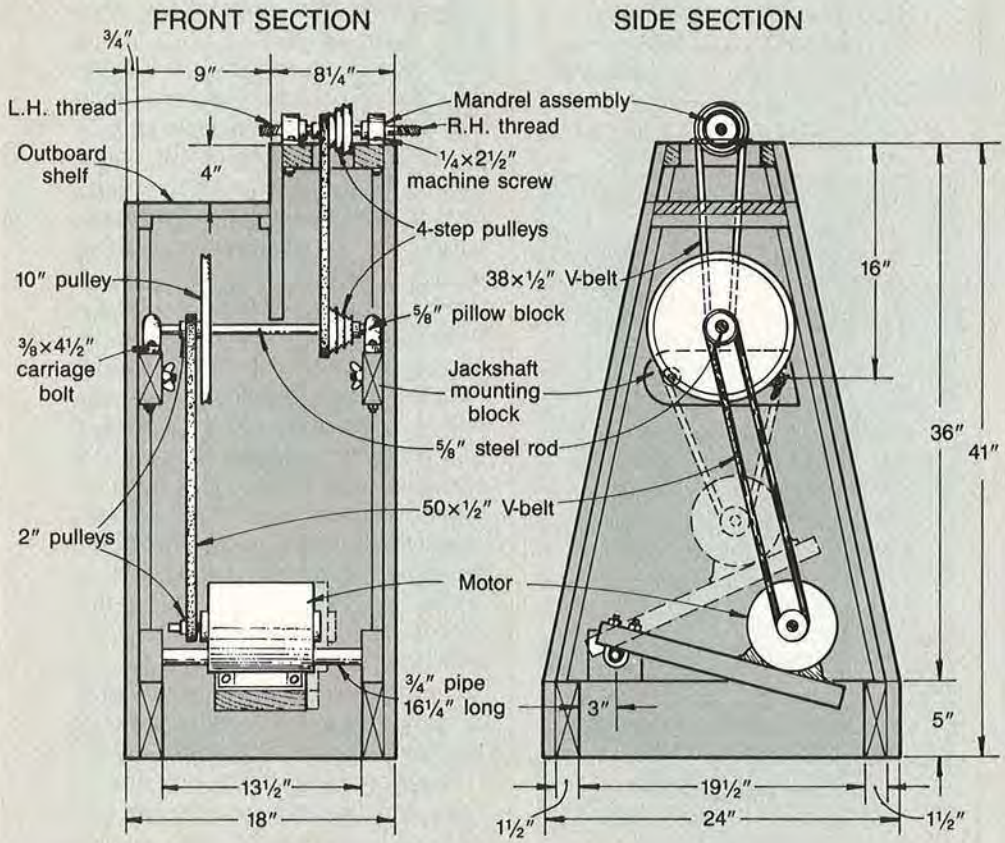
—James Downing, Design Editor


Note: 1/8" thick birch banding on exposed edges of plywood is not shown.
R=3/8"
#8×1½" F.H.
Clearance for shaft
Miter-gauge groove
Magnetic catch strike plate
1/8" Baltic birch plywood
Vacuum-hose adapter
#8×1½" F.H.
Shaft clearance slot
3/8" T-nut
#8×1½" F.H.
1/2" hole
3/8" rabbet 3/16" deep
Notch to fit sanding disk
1×6" piano hinge
#8×1¼" F.H.
7/16" holes
Round magnetic catch
Mandrel assembly mounting holes
#8×1¼" F.H.
3/8×2" R.H. machine screw
#8×1¼" F.H.
8½"
12° bevel
Jackshaft mounting block
Magnetic catch
1/4" wing nut
Power switch
Motor-mount pivot block (only one shown)
#8×2" F.H.
3/8" hole for power cord
Wooden knob
1/4" washer
3/8×3" carriage bolt
41"
1⅛" hole
3/8" hole
Holes to fit motor bracket
1/4" hole
3/8" hole for power switch cord
1/4×3" carriage bolt
12° bevel
2½" steel hinge
#8×1½" F.H.
3/4" pipe 16¼" long
1/8" vein 1/8" deep
#8×3" F.H.
#8×½" F.H.
1½" motor block
Washers
5"
24"
12° bevel
U-BOLT DETAIL
Metal plate (comes with U-bolt)
1/4×3½" U-bolt
1½"

Cutting Diagram







Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
CABINET					
A	1½″	5″	16½″	fir or pine	2
B	1½″	5″	19½″	fir or pine	2
C*	¾″	24″	41″	plywood	2
D	¾″	12⅛″	12″	plywood	1
E	¾″	9″	9″	plywood	1
F	1½″	6¾″	7⅝″	birch	1
G**	¾″	¾″	9⅛″	birch	2
H	¾″	5″	16½″	plywood	2
I**	¾″	¾″	32″	birch	2
J	¾″	¾″	35¼″	birch	2
K	¾″	¾″	15″	birch	2
L*	¾″	16½″	36¾″	plywood	1
M*	¾″	16⅝″	36⅝″	plywood	1
N	1½″	3½″	3½″	birch	2
O	1½″	5½″	17″	fir or pine	1
P	1½″	3½″	10½″	birch	2
Q**	¾″	5″	8½″	plywood	2
R	¾″	¾″	4⅝″	birch	2
S**	⅛″	14½″	5⅞″	Baltic birch ply.	1
DISK-SANDER TABLE					
T*	¾″	5½″	10¼″	plywood	1
U	¾″	5⅝″	9″	plywood	2
V	¾″	8¾″	9″	plywood	1
W	¾″	10″	16″	particleboard	1

*Dimensions include use of birch banding on these pieces.

** Some parts are cut larger initially, then trimmed to finished size. Please read the instructions before cutting.

Supplies: #8×1¼″ flathead wood screws, #8×1½″ flathead wood screws, #8×2″ flathead wood screws, #8×3″ flathead wood screws, 1—¾×16¼″ black-iron pipe, 2—¼×3½″ U-bolts with metal plate/washers/nuts, 4—⅜×4½″ carriage bolts and nuts, 2—¼×3″ carriage bolts with washers/wing nuts, 2—⅜×3″ carriage bolts with washers/hex nuts, ⅜×2″ roundhead machine screws and ⅜″ T-nuts, 4—¼×2½″ hex-head machine screws/lock washers/nuts, 1—38×½″ V-belt, 1—50×½″ V-belt, ⅝×16¼″ round steel shaft, 1 pair—¾×2½″ loose-pin butt hinges, magnetic door catch, round magnetic door catch, 1″ continuous (piano) hinge 6″ long, contact cement, wood door knob, plastic clamps for holding electrical cord, balance sheet, plastic laminate, paint

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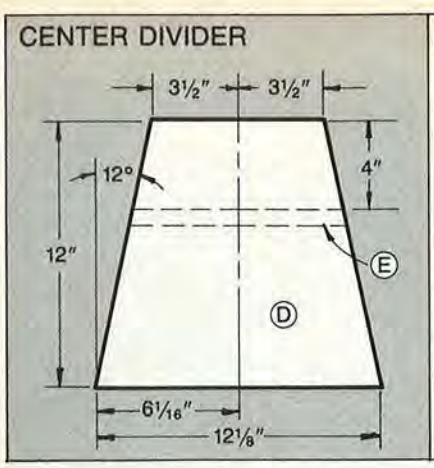
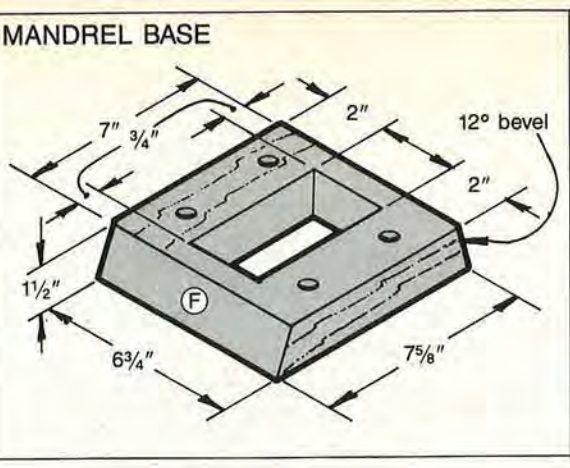
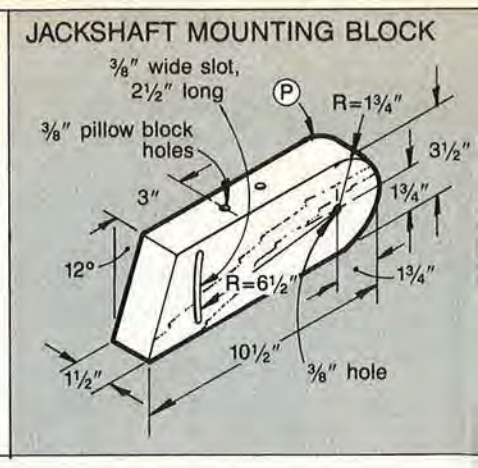






the Bill of Materials. Then, lay out and cut the center divider to shape as shown in the Center-Divider Drawing. Also, bevel the edges of E at 12° to match the angle of D.

6 Using solid birch or laminated stock, cut the mandrel base (F) to size, then to shape as shown in the Mandrel-Base Drawing, bevel cutting the ends at 12°. Use flat stock, as the top of F must be perfectly flat when you later mount the mandrel assembly to prevent the mandrel shaft from binding. Mark the location of the belt opening on F. Drill a hole through F large enough for a jigsaw blade, then cut the opening to size.

7 Glue and screw the center divider (D) to the mandrel base (F). (The top and sides of D should be flush with those of F.)

8 Cut the two outboard shelf support cleats (G) to size plus 1" in length. Glue and screw both cleats to the bottom of the outboard shelf, and cut the ends of the cleats flush with the shelf's beveled edges. Glue and screw the shelf-cleat assembly 4" down from the top of D, as shown in the Cabinet Front-View Drawing on page 43.

9 Glue and screw the D-E-F-G assembly to the cabinet sides. Make sure that the assembly sits in ¾" from the front and rear edges of both side panels.

10 Cut the toe kicks (H) to size, then glue and screw them to the cabinet base.

11 Cut cleats I, J, and K to size. Drill pilot holes in the back cleats (one I and one J) before fastening them to the cabinet sides. Doing this makes it easier to mount the back panel (L) later. Cut a 12° bevel on one edge of each K cleat. Then, glue and screw all of the cleats to the side panels and the base frame. Position them ¾" back from the edges to accommodate the back panel and door. See the Exploded-View Drawing on page 42 for correct placement.

12 Cut the back panel (L) and the door (M) to size, beveling the bottom and top end of each at 12°. Cut a 4×9" notch in both the back panel and door to accommodate the outboard shelf. Glue and screw the back panel to the cabinet. Attach the hinges and hang the door.

INSTALLING THE MOUNTING BLOCKS

1 Cut the motor-mount pivot blocks (N) to size. Find the center of each by drawing lines between opposing corners, and bore a 1⅛" hole in the center of each to accommodate the ¾" pipe (1" outside diameter). Drill pilot holes through each block for mounting to side panels C. Cut the pipe to 16¼", and slip a mounting block on to each end. Glue and screw the blocks, with the pipe inserted, to the cabinet sides where indicated on the Side-View Drawing.

2 Cut the motor-mount block (O) to size. Drill ¼" holes for the U-bolts where shown in the U-Bolt Detail. Attach O to the pipe and tighten the U-bolt nuts, allowing the block to slide on the pipe.

3 Cut the jackshaft mounting blocks (P) to size, then lay out and cut them to the shape shown in the Jackshaft Mounting-Block Drawing. Measure and mark the location of each block's slot, drill two ⅜" holes, and join the holes to form the ⅜"-wide curved slot by cutting out the path with a jigsaw. Drill ⅜" holes in each P for mounting the pillow blocks and for the pivot bolt.

BUILDING THE MANDREL COVER

1 Cut the cover's sides (Q) to rectangular shape, then scribe a 4" radius 1" from the bottom, as shown in the Mandrel-Cover Side Drawing. Cut the sides to shape, and cut the shaft clearance slot. Using a straight bit and router table as shown in the photo, *above right*, cut a ⅛" rabbet ⅝" deep in each Q to house the hood (S).

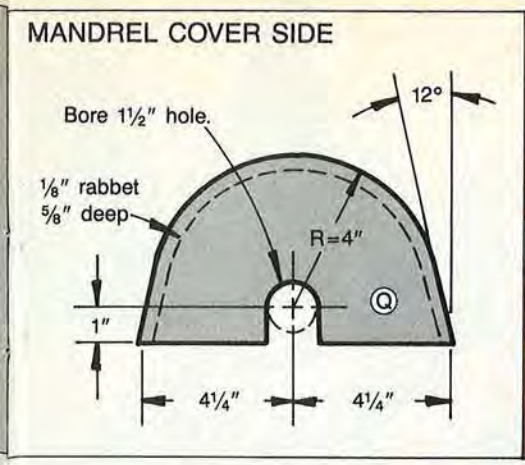
2 Cut the cleats R to size. Bevel-rip one edge of each cleat at 12° to accommodate the angle of the rabbet and the hood.

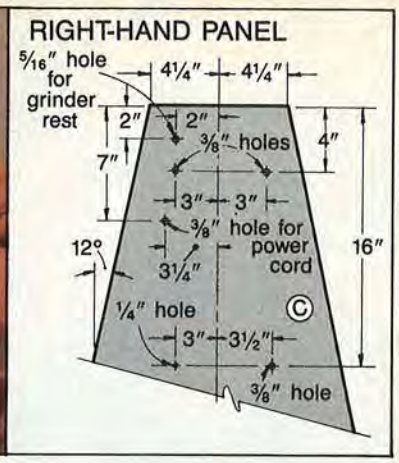
3 Glue and clamp the sides (Q) to the cleats (R). Drill pilot holes and fasten the sides to the cleats with #8×1¼" screws. Position the screws toward the inside edge of the back cleat to prevent hitting the screws when you rout out the hinge rabbet in step 5 later.

4 Rip and crosscut the hood (S) from ⅛" Baltic birch plywood. Sponge the outside of the plywood with hot water to make it more pliable. Apply glue to the rabbet in Q, then clamp and roll the plywood into the rabbet. (This step takes two people—one to hold the side-cleat assembly and one to roll the plywood into the rabbet and attach the clamps.)

5 After the glue dries, rout a ⅜" rabbet 3/16" deep in the hood to accept the continuous hinge. Cut a 1"-wide hinge to 6", and screw it to the cover and to the stand.

6 Position and drill the hole for the magnetic catch into the top edge of D. Install the catch, then





align and attach the strike plate to the bottom of the cover (Q).

MOUNTING THE MECHANICAL PARTS

1 Remove the pulley that comes with the mandrel assembly, and attach the four-step pulley to the mandrel, as shown in the Front-View Drawing. (While we used the sleeve-bushing pillow blocks that are part of the mandrel assembly, we highly recommend using self-centering pillow blocks. We experienced excessive power loss at high speeds due to bushing friction. See Buying Guide for details.)

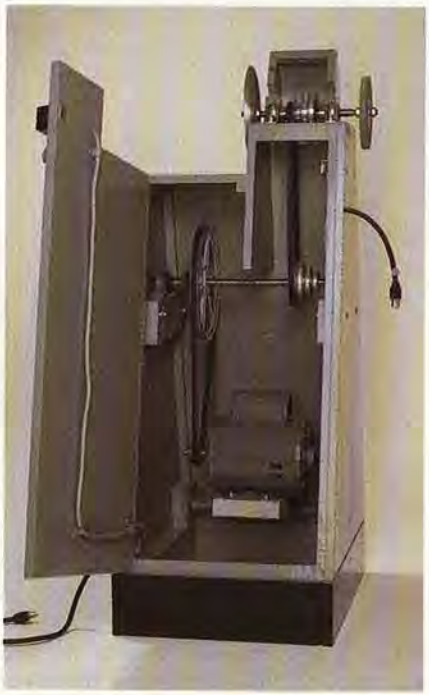
2 Position the assembled mandrel on the mandrel base (F), and mark the pillow-block hole location. Drill the holes and bolt the mandrel to the base with a 38" V-belt looped over the pulley. Once the assembly is mounted, spin the ⅝" shaft by hand to check for any misalignment caused by tightening the mandrel assembly to the base (F). Shim if necessary. (The use of self-aligning bearings compensates for shimming.)

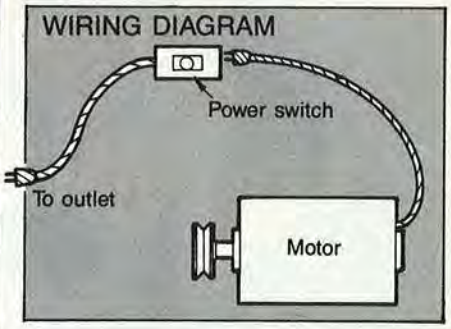
3 Drill the ¼" and ⅜" holes in both side panels as dimensioned in the Right-Hand Panel Drawing. Mount the jackshaft-mounting blocks (P) to the sides of C. *Finger-tighten* the nuts.

4 Cut ⅝"-round steel stock to 16¼" for the jackshaft. Slide the four-step pulley, 10" pulley, 2" pulley, and self-centering pillow blocks onto the jackshaft, as shown in the Front-View Drawing and in the photo, *right*. The pillow blocks we used (see Buying Guide on page 85) have shaft-locking collars that prevent the shaft from moving laterally when in use. Position the upper and lower V-belts, and secure the assembly to the mounting blocks (P) with carriage bolts.

5 Position the motor near the end of the motor-mounting block (O), and mark the location of the holes. Drill the holes, and secure the motor to the block. Slide the 2" pulley onto the motor shaft. Lift the motor and mounting block up and align the belts and pulleys as shown in the Front-View Drawing. Once everything is lined up, lower the motor and tighten the set screws on the pulleys.

6 Drill a ⅜" hole through the right-hand panel (C) as indicated earlier in the Right-Hand Panel Drawing, and feed the motor cord through it. Run the cord along the inside of the cabinet as shown in the photo, *below*, and connect it to the motor. Be sure to wire the motor so that it rotates clockwise during operation as illustrated in the Mechanical-Components Drawing.



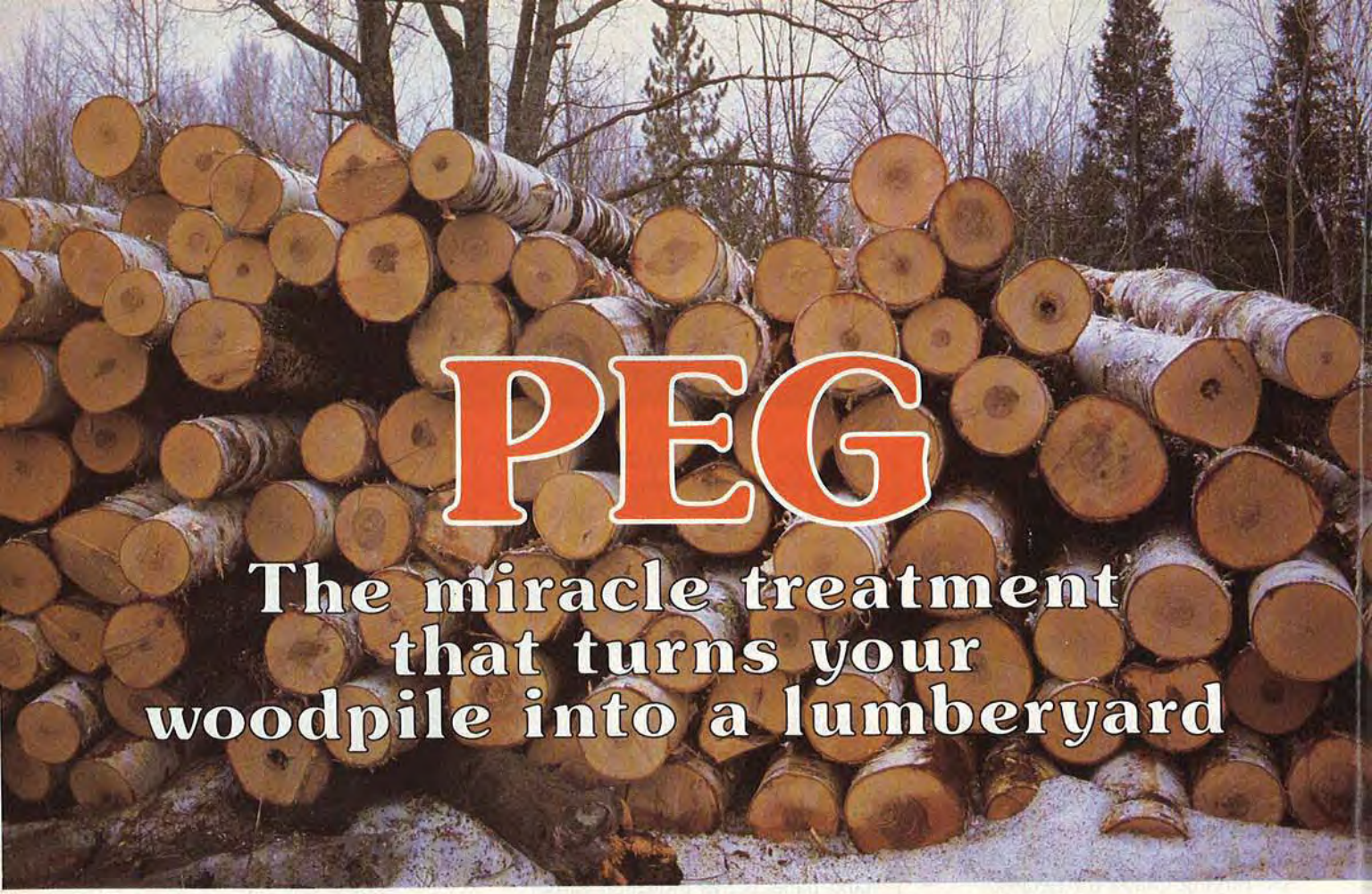


7 Disconnect the electrical cord from the switch. Position the power switch on the door, then mark and drill the mounting holes. Drill ⅜" wire access holes through the door and left-hand panel (C). Run the cord from the left-hand panel, along the inside back edge of the door, and through the power-cord access hole, and reconnect it to the switch. Allow plenty of wire between the door and cabinet so that the door opens and closes without stretching the cord. (We used plastic clamps to mount the cord to the cabinet and door.)

8 Attach the wooden knob to the door front. Install a magnetic catch on cleat J and the strike plate on the back of the door.

Safety Note: This system is designed so that you must unplug the switch in order to open the door to change speeds. This disconnects power to the motor, eliminating the possibility of accidentally starting the motor while changing belt positions or when working on the inside of the cabinet.

Continued on page 84



PEG

The miracle treatment that turns your woodpile into a lumberyard

It's fast and it's fun. It's also somewhat unpredictable.

"It's a doggone miracle what PEG can do," says Patrick Spielman, expert woodcrafter and teacher based at Fish Creek, Wis. "I first heard about it 20 years ago, and PEG's possibilities still amaze me!"

Back in the Fifties, forestry researchers began taking a close look at how PEG, short for *polyethylene glycol*, "freezes" wood in its green state. Since then, the chemical has seductively fascinated both researchers and woodworkers.

Why so much excitement about something that sounds as if it belongs in your car radiator? Far from being an antifreeze, this version of polyethylene glycol has special properties that allow experimenters to season freshly cut green wood chemically to prevent cracks, checks, shrinking, and warping.

What's so special about PEG?

With PEG, there's no need to worry about conventional drying methods to stabilize woodworking stock—no

PEG, the waxy-looking block in the background, makes it possible to turn bowls with the bark still on and use fresh-cut green wood.

air-drying, no kiln-drying, no long waits for proper seasoning. Your woodlot becomes your lumberyard. You can work green wood right from the tree into lamps, bowls, vases, candlesticks, slab clocks, tables, or carvings. Treated with PEG, a project you spent hours on won't suddenly be ruined by a crack down the middle.

PEG offers good insurance against such unplanned disasters, even with thick, heavy slabs, or chunks. And for a real rustic look, you can leave the bark on the wood—after PEG treatment, it won't fall off.

As for safety, it's not a problem. PEG is nontoxic, can't be absorbed through the skin, has no odor, and won't explode. In fact, "relatives" of PEG are used in lotions, cosmetics, and deodorants.

Even with all this going for it, PEG has a hitch: Clear-cut guidelines about its use just don't exist. You learn to use it by trial and error. However, after more than two decades of experiments, enough rules of thumb have been developed so even first-time PEG users have a good shot at success.

How PEG works its magic

Researchers have found that PEG with a molecular density of 1000 does the "curing" job best. PEG 1000 comes as a waxy, white, semi-solid that looks a lot like paraffin. When green wood is immersed in a PEG-water solution, the large PEG molecules displace the wood's natural moisture. Because PEG evaporates little compared to natural moisture, it stabilizes the wood's cell structure.

The challenge is to get PEG to infuse the intricate cellular structure of green wood without wasting time or chemical. Old hands such as Pat Spielman recommend using completely green, fresh-cut wood. If you want to use dry or partially dry wood you have on hand, soak it in water for two to three weeks.

PEG has to saturate wood to within 25 to 30 percent of its "dry" weight. For instance, a 4-pound dry log should weigh a little over 5 pounds after PEG treatment. PEG only works when there's water in the wood.

You can treat wood with PEG in two ways. Totally immerse it in a PEG solution, or if the project is too large or thick, surface-treat it. Often, only a few brush applications are needed.

Variables make using PEG tricky

PEG-treating know-how boils down to reading the variables: the concentration of the PEG/water solution and its temperature, plus the characteristics of the wood, such as its density, structure, moisture content, and thickness.

PEG suppliers offer charts showing how to mix up either a 30- or 50-percent PEG solution by weight.

"A 30-gallon vat can hold about $50 worth of PEG—enough to treat a whole tree!"

The difference is that the higher the PEG-to-water ratio, the shorter the treatment time. Heating up the solution to around 140 degrees also speeds up the absorption process.

Veteran PEG users stack the deck in their favor by reducing variables, such as the type of wood. Pat, for example, works mostly with butternut. Another experienced PEG user from Grand Rapids, Minn., Jim Gabrielson, first started with birch, but now uses elm exclusively. And Jim is no dabbler—he goes through more than a half-ton of PEG a year, treating elm in a 500-gallon stainless steel commercial vat and drying it in a large drying room he built himself.

Getting started with PEG

PEG sells for about $3 a pound in a minimum order of 10 pounds. But a little goes a long way. Since it doesn't evaporate, only the PEG absorbed by the wood being treated gets used up. "It's only pennies when you figure it in cost per project," explains Pat. "A 30-gallon vat can hold about $50 worth—enough to treat a whole tree!"

Commercial PEG vats cost money, too. Those sold by Pat range from about $300 for a 10-gallon unit to $445 for a 50-gallon one. A heating element costs extra. But, you can side-step this investment by fashioning one of your own. To get started, use a plastic trash can, heavy-gauge plastic trash bag, or even a children's plastic lawn-type splash pool. Try for round shapes because they'll require less PEG: The chemical is wasted in the corners of square containers unless your projects tend to be square.

Keep the wood you're treating submerged in the PEG/water solution by wedging sticks across the surface between the sides of your temporary vat. Be careful not to puncture the sides or you'll lose costly PEG.

Turn the page to learn how PEG pros such as Pat Spielman work with this wonder chemical.

For more information on the PEG process, check out Pat Spielman's *Working Green Wood With PEG*, ($8.95, Sterling Publishing Co., 2 Park Ave., New York, NY 10016).

WHERE TO BUY PEG

These are the suppliers we know about from whom you can order PEG and PEG-related equipment:

- Albert Constantine & Son, 2050 Eastchester Rd., Bronx, NY 10461
- Craftsman Wood Service, 1735 W. Courtland Ct., Addison, IL 60101
- Crane Creek Co., P.O. Box 5553, Madison, WI 53705
- Jim Gabrielson, 2317 La Plant Rd., Grand Rapids, MN 55744
- Garret Wade Co., 161 Ave. of the Americas, New York, NY 10013
- General Finishes, P.O. Box 14363, Milwaukee, WI 53214
- Industrial Arts Supply, 5724 W. 36th St., Minneapolis, MN 55416
- PITSCO, P.O. Box 1328, Pittsburg, KS 66762
- Spielman's Wood Works, 188 Gibraltar Rd., Fish Creek, WI 54212
- Wilkens-Anderson Co., 4525 W. Division St., Chicago, IL 60651
- Woodcraft Supply, 313 Montvale Ave., Woburn, MA 01801

Continued

JIM GABRIELSON PROFITS FROM BREAKING THE RULES

Long-time PEG user Jim Gabrielson has learned to bend, even break, PEG rules to get projects done faster, easier, or less expensively. He's also learned how to successfully treat elm, usually a no-no for PEG.

Jim keeps chunks of elm soaking in water barrels until he rough-turns them on his lathe. He's not inclined to give away any secrets from his PEG processing, but does say you can tell a chunk of elm good for PEG treatment "if it sinks to the bottom of a water barrel."

Elm, dense and hard, supposedly is tough to PEG-treat. Here, elm turnings of thick, thicker, and thickest stock await finishing.

To aid PEG penetration, Jim often raises the temperature of his treating solution above the recommended 140 degrees F. and uses a hot water heater connected to his vat to do the heating. He also likes to "prestain" his elm by adding bits of metal to the PEG-water solution so they cause a reaction that discolors. For drying, Jim rigged up a squirrel-cage fan to circulate air heated by a wood stove through his 10×20' drying room.

Jim may approach PEG unlike other woodworkers, but he does agree with them on one thing: Every piece of wood works with PEG differently.

HOW PAT SPIELMAN USES PEG

Here's how Pat Spielman transforms wet, green wood into beautifully turned finished projects in less than a week. Remember that the process varies from craftsman to craftsman and from wood to wood—you may come up with a method that works better for you.

1. Preshaping green wood

Pat begins his PEG projects right outside his shop. With a chain saw, he cuts chunks of his favored butternut from a recently downed log. PEG allows him to be creative because it forgives knots, grain direction, and other features that normally would contribute to cracking.

Some pieces he cuts to turn with the grain; others he rounds off to turn against it. If Pat won't be working the wood right away, he seals it in plastic trash bags to preserve its moisture. Don't store wood this way too long, however. It tends to mold, deteriorate, and discolor.

2. Rough-turning the project

Pat rough-turns each chunk of log to its nearly finished shape at his lathe. Because PEG penetrates a maximum of 1" into the wood he uses, he has to leave ¼" to ½" of thickness for final working after the piece has been treated and dried. That way, there will be enough PEG left in the wood after it's finished to prevent checking or cracking. The core of the wood will remain forever green, frozen inside the PEG layer.

3. Treating wood with PEG

The formula that works for Pat calls for a 50/50 PEG-to-water concentration. PEG, which melts at 104 degrees F., would take days to blend with cold water, so Pat melts it down from its waxy state in a separate non-ferrous metal container. Then, he adds it to the water in his specially designed vat.

Except for stainless steel, PEG reacts with metals and causes the wood to stain. Therefore you have to use a non-metal container to hold the PEG-water solution. Pat uses a tank he developed and markets called the *Thermo-Vat.* It's a heavy-gauge plastic container with a tight-fitting lid and built-in heating element that raises the solution temperature to 140 degrees F. for faster penetration into the wood.

A floating wood cover keeps the green, rough-turned pieces submerged in the solution. Depending on their thickness, the pieces stay in the vat for up to four days.

4. Drying and sanding the stock

You can dry PEG-treated work by hanging it from the rafters of a garage or attic, a method that can take a few weeks. But Pat finds a kitchen oven much faster. He sets it at 180 degrees F., chucks in the wood, then forgets it for the 8 hours or less it takes to dry.

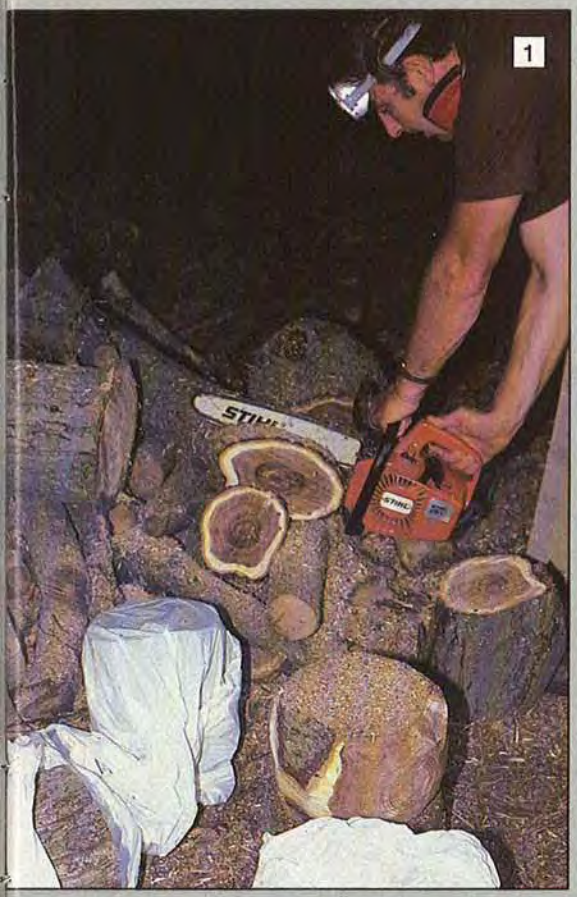
Out of the oven, the dry turnings go back on the lathe for final working. Pat turns them down just enough to be smooth. "You don't want to go in too far and expose untreated wood," he says. Next comes the sanding, which he does with wet-dry paper from 60- to 120-grit.

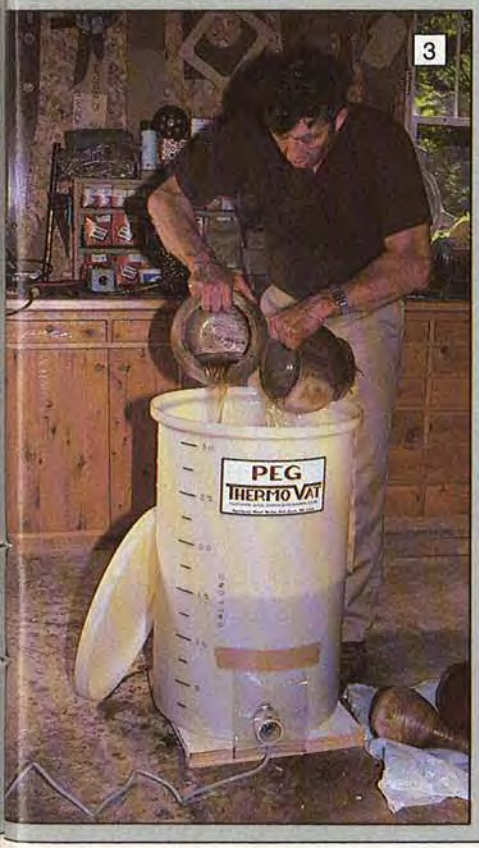
"Wet-sanding won't hurt your project," according to Pat. But, he cautions, "because PEG is water-soluble, you don't want to soak the piece in water or put it under a running faucet."

5. Finishing PEG projects

In only a few hours after sanding, Pat's PEG-treated pieces can be finished. Pat likes to use Danish oil, but he occasionally applies polyurethane. For the luster evident in the "birds-eye" bowl shown, Pat topped the polyurethane off with a coat of paste wax.

Without PEG's help, the figure showing in the end of the freshly sawn log couldn't be used for woodworking. If it found its way to the lumberyard in the first place, chances are it would crack later.





SPIELMAN'S PEG TIPS

● **How to run a PEG treatment test:** "Cut six ½"-thick slices from a green log, and toss them in your PEG solution. Take one out after 24 hours and label it. Take another out after 36 hours, and so on, adding 12 hours each time. When they're all out, stick them in an oven set at 180 degrees. After 8 hours, see which ones haven't cracked or split and look the best, then base your PEG soaking time on those results. Try this for each type of wood you want to use."

● **About choosing wood:** "Start with low-density woods such as white pine, aspen, cottonwood, willow, or butternut. Avoid dense hardwoods such as black walnut, fruitwoods, maple, yellow birch or beech until you know the process. Then, you can start experimenting, which is half the fun of using PEG."

● **On PEG penetration:** "Drill holes in the bases of thick projects such as lamps to get better absorption into the end grain."

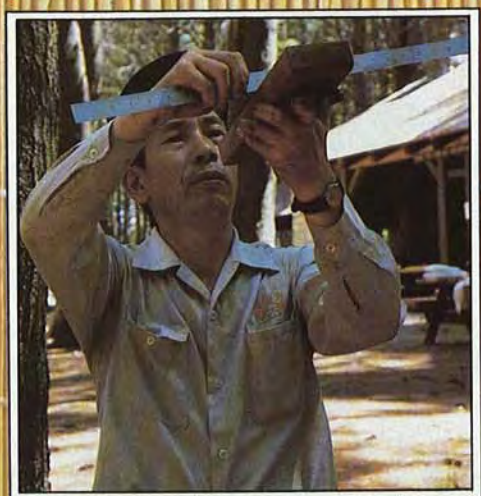
● **On sanding:** "Sand the wood with wet-dry paper right on the lathe. Keep one piece of paper soaking in water to wash off the gum buildup."

● **About overtreatment:** "Don't prolong soaking or use solutions greater than 50 percent PEG. The wood will become harder to sand and the piece may sweat in high humidity."

Produced by Peter J. Stephano with Gene Schnaser
Photographs: Jim Elder; Hopkins Associates; Ginny Peifer; Gene Schnaser

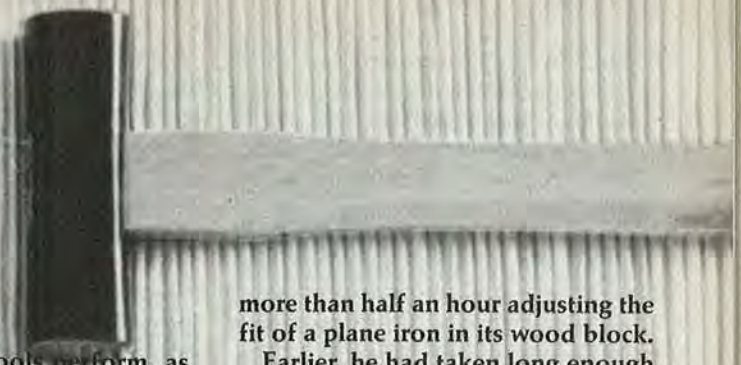
MADE IN JAPAN

Do the Japanese have a better hand tool idea?



Setting up for planing, above. Craftsman/ teacher Fujieda Hiroaki aligns a plane iron for straightness, a delicate task.

More and more American woodworkers are becoming enchanted by hand tools from the Land of the Rising Sun. Why? Because these tools really work, often in surprising ways.



Print this article

To the untrained eye, a Japanese plane, fashioned from a block of oak and two rough-looking slabs of metal, appears too primitive for precision. Yet, it shears paper-thin, translucent shavings. A Japanese saw, the blade thin and delicate, looks too fragile for hard work. But it can notch an 8×8" beam with ease.

Does this make them better than the tools we're used to? In many respects, the answer is "yes." However, Japanese hand tools are very different, and intriguing.

Tools shown on these pages: Clockwise from top left, *Ryoba noko giri* for shallow miters, dovetails, and crosscuts; *Dozuki noko giri* for easier joinery sawing in tropical hardwoods; *Ryoguti genno etuki* chisel hammer with balanced head; 1/4" and 3/4" *Aogami magane oire nomi* top-grade, blue-steel chisels; *Hinagata* polishing plane; *Mentori ganna* plane cuts chamfers to 1" wide.

Watching these tools perform, as we did at a recent seminar in New Hampshire, is both foreign and fascinating. The *shokunin*, as Japanese craftsman are generally called, places the work he will plane on a downward-slanting beam and draws the plane toward himself. During the stroke, he steps back with a dancer's grace. Sawing, he either stands, bending over the wood and holding it in place with his foot, or sits. Then, to make the cut he pulls the blade through the wood, since its teeth are angled to cut only on the draw.

Technique for using Japanese woodworking tools runs contrary to many traditional western methods. Yet, according to one major importer, U.S. retailers sold $3 million worth of better-quality Japanese tools last year—double the figure of just two years ago. What's behind it all?

To find out, we spoke with folks who sell, and most importantly, use Japanese woodworking tools. One of our first discoveries was that among the hoards of tools available (see page 53 for details about many of them), Japanese planes, saws, and chisels prove popular first-time choices because they adapt themselves well to the western way of doing things.

JAPANESE PLANES: WELL WORTH THE HASSLE, BUT FRUSTRATING FOR BEGINNERS

Fred Damsen, owner of The Japan Woodworker, a California-based tool importer/retailer, says that no Japanese plane comes ready for use. "When you get your plane home," instructs Damsen, "let it sit in your shop for a month so the wood and metal climatize. Then set it up."

At the seminar we attended, which was sponsored by Robert Major's Mahogany Masterpieces, a prominent New Hampshire importer/retailer, we watched one Japanese instructor take more than half an hour adjusting the fit of a plane iron in its wood block.

Earlier, he had taken long enough to sharpen the iron that we thought we were witnessing a religious ritual. Clearly, adjusting and caring for these tools is a hobby in itself.

Matthew Connerton of Newburyport, Mass., a professional woodworking craftsman and recent Japanese tool convert, even protects his planes from too much sun. "The metal is lively. It moves just as the wood does," he explained as he moved them into the shade.

In Japan, artists make planes for other artists to use. Thomas Hucker, a furniture designer and maker from Boston, came face to face with this tradition. In Japan, he went to a large hardware store and asked to see the best plane they had. "They wouldn't even put it on the counter. I think they assumed I wouldn't know how to work it," he told us. "The one I bought, I'm scared to fool around with. I would never recommend that anyone buy expensive tools right off."

Whether it's expensive or moderately priced, a Japanese plane, in knowing hands, can be a real joy to use. Explains Nancy Hurwitz of the Japan Woodworker: "Because the quality of the steel is so high, and you can adjust it so fine, you get shavings you can see through."

RAZOR-SHARP SAWS ARE FRAGILE, TOO

The Japanese laminate a layer of high-carbon, hard steel to a layer of softer, low-carbon steel for their plane blades. In doing so, we were told, the softer layer absorbs shock; the hard layer affords a sharp, long-lasting edge. Saws are different, however.

According to shokunin and author Toshio Ōdate, the pulling stroke used with the Japanese saw doesn't allow the blade to bow. Therefore, it can be of thin, crisp, high-carbon

Continued

steel. Since the steel is very hard, the teeth can be filed to razor sharpness—and they stay sharp.

In practice, we observed a thin-bladed Japanese saw slice through a cedar post in seconds and another much like it used to fashion fine dadoes and rabbets in ½" stock. How can this be? Hurwitz likens the use of the thin blade to a piece of grass. "You can pull a blade of grass through anything," she says, "but you can't push it."

Saws may be the most practical of Japanese tools for the home woodshop, and among them, the *dozuki* ranks as a useful, sensible choice. Similar to a backsaw, its blade, though extremely thin, is less likely to break than those of other Japanese saws. That's because its back has a steel reinforcing spine.

CHISELS THAT STAY REALLY SHARP

Of all Japanese tools, chisels differ least from their western counterparts in use, but they still draw raves.

Harrison Stanley, a professional woodworker from Groton, Mass., oddly enough uses Japanese tools to craft Early American furniture reproductions. About chisels he says: "The steel they use means that I only have to sharpen mine once a week—and even then they don't really need it." Here again, the key to their sharpness lies in the use of the layered high- and low-carbon steel.

HOW TO BUY HIGH-QUALITY JAPANESE TOOLS AND STILL KEEP RICE IN YOUR BOWL

Some converts to Japanese tools get infatuated right away. Connorton, for example, bought $1,500 worth of them in a day. Unbelievably, though, some folks have paid that much or more for a single saw, a plane, or a couple of chisels. One saw in the Mahogany Masterpiece line lists for $12,000!

That saw, crafted by a master artisan, is more a one-of-a-kind collector's item than a tool. Yet, saws priced by both The Japan Woodworker and Mahogany Masterpieces at $650 and up are meant to be used, and used hard. Do you have to spend that much for a useful tool? Happily, the answer is not at all.

At The Japan Woodworker, Damsen and Hurwitz say a $26 saw will last through 30 years of weekend woodworking. But after using your first saw for a few years, you might want to move up to a $60 model. "In quality," explains Damsen, "the difference between a $60 saw and one at $120 might only be 15 to 20 percent." But, they both add, some people buy $650 saws, $400 planes, and $40 chisels for the same reason they buy cars that go 130 m.p.h., even though the speed limit is 55.

Major takes a slightly different stand. "There's a price level that I would never go below. In saws, that range is about $40. In chisels, it's three for $40. A small plane would be about $50, and a full-size plane not less than $75. "But," he says, "if somebody makes a big investment in cash and meets it with an investment in time, he's much better off than someone who bought a cheap tool as an experiment."

Assessing this advice, it appears as though you can buy Japanese tools of high quality and still keep rice in your bowl. But no matter what you spend,

Working backward, above. Japanese saws like this *ryoba* cut on the pull stroke with their thin, brittle blades. But sawing goes fast.

Chisels are chisels, above right. Except for their sharpness, there's little difference in using Japanese chisels. Here, a plane block is finely shaped.

Planing, Japanese style, lower right. Matthew Connorton, a Newburyport, Mass., woodworker, sets the workpiece on a slanting planing beam, then pulls the plane toward him. Note the paper-thin shavings the plane produces.

how can you be sure you received the quality you paid for?

BUYMANSHIP ADVICE: WHAT YOU SEE MAY NOT BE WHAT YOU GET

Most Japanese tools sold in the United States are marketed through catalogs. But Major, who produces a striking four-color tool catalog, says you can't always rely on photographs. "In a photograph," he says, "the Japanese saw that costs $30 looks identical to one that costs $12,000." And Damsen says that some saws with top-of-the-line price tags would not be good buys at half the price. "If you buy them," he advises, "you'll be paying as much for the handle as the blade."

So where does that leave you when it comes time to buy and try some Japanese hand tools? Author Ōdate, in his book, suggests that because the trade in these tools is still so young and there's so much to know about them, American buyers must depend on those who sell tools to offer quality choices. It may not be a case of "buyer beware," but buying from someone you can trust helps to insure that your money will be well spent. If it's possible, you may also want to try the tools first. If you order by mail, look for a "satisfaction guaranteed or your money refunded" statement.

Both retailers agree that tools should be given a hands-on test in the store before you buy, trying different grades of the same tool. Being informed helps, too. Major publishes a newsletter jam-packed with information about Japanese tools and sponsors a seminar each summer. Damsen provides helpful information in his catalog, and at his store, but advises the next best thing to handling and using the tools first is a phone call to the seller. "Talk to them. That's the best way to tell what you're likely to get," he says.

WHERE TO GET MORE INFORMATION

For a newsletter about Japanese tools, a catalog and seminar information, write: Mahogany Masterpieces, RFD 1, Wing Rd., Suncook, NH 03275. For a tool catalog, write: Woodline, The Japan Woodworker, 1731 Clement Ave., Alameda, CA 94501.

The *sumitsubo*, above, is the symbol of the Japanese woodworking craftsman.

SPEAKING THE LANGUAGE

Japanese saws fall into two main categories: *kabata*, with teeth on only one side of the blade, and *ryoba-noko*, which have teeth on both sides. Some *kabata* saws rip only; others do crosscuts. The *ryoba* saws, depending on which set of teeth is used, make both.

Blades of *azabiki* saws are short and rounded. The curved blade allows you to start cuts in the center of a board, and it can make large curving cuts.

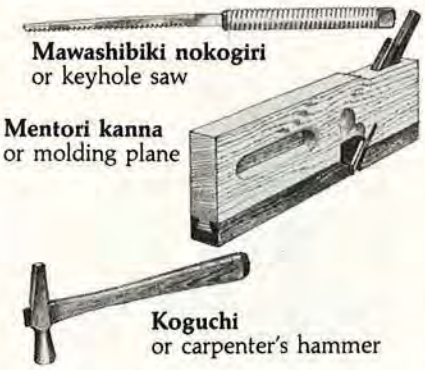
Kugihiki saws have teeth on just one edge of a very flexible blade. They're used to cut off the excess of wooden pegs flush with the work.

Japanese keyhole saws, or *mawashibiki-nokogiri*, look much like western versions, but their blades are so thin they actually can cut keyholes.

Some saws have interchangeable blades. If you break a saw tooth—a relatively common experience for novices—you can remove the damaged blade and insert a new one.

Sandpaper, to a Japanese woodworker, is a rare commodity. Their planes, called *kanna*, play a leading role in finishing, and they make surfaces as smooth as fine sanding.

Most Japanese planes have one blade that does the cutting and a chipbreaking second "blade," adopted from the West, which reduces tearout. Planes give you a variety of choices, for different purposes and of varying sizes. They can cut flat surfaces, grooves, rabbets, dovetails, and decorative moldings.



Hammers, or *tsuchi*, in Japan, like hammers in the West, pound nails. Some even look like ours. Others are far more ornate than anything in a western toolbox. One type, shaped like a mallet, has no claw and is named *ryokoguchi*. Its head is flat on one end and convex on the other. The flat face drives the nail in until the second-to-last stroke. Then, the hammer is turned over and the convex face taps the head of the nail below the surface.

Japanese gimlets, called *kiri*, of various sizes, drill holes for pegs by rolling them between the palms. Western drills work much faster.

An array of Japanese measuring tools—framing squares, rulers, marking gauges, and compasses—is available. They differ little from western versions, except for the *sumitsubo*.

A symbol of the shokunin, the *sumitsubo* has remained more ornate than necessary through the centuries. It looks less like a tool and more like an antique whale oil lamp, and does little that a western chalk line cannot do.

A bowl carved into the sumitsubo's wooden body holds ink and a silk wad. A wheel with a crank shrouds a long silk line, which is drawn through the inky silk. In use, the line stretches tightly from one end of the work to the other, and is held in place with a pin. To mark, the line is snapped to produce a straight line as you would do with a chalkline. Held at an angle, while firmly attached to the wood at both ends, the line can be snapped to form a curve.

To learn more about Japanese woodworking tools, read: ● Japanese Woodworking Tools: Their Tradition, Spirit and Use, *by Toshio Ōdate, The Taunton Press, Newton, Conn., 1984, $27.95;* ● *Japanese Woodworking Tools: Selection, Care and Use, by Henry Lanz, Sterling Publishing Co., New York, N.Y., $12.95.*

Written with Greg Erickson
Photographs: Hopkins Associates; Greg Erickson

WOODWORKERS' STANDARDS

SEATING

It's no accident that standard kitchen countertop height is 36", that 5/4 lumber measures 1⅛" thick when dried and surfaced, and that the correct backrest angle for dining ranges from 0° to 5° to the rear. These and a host of other standards have been established over the years by the furniture and wood industries, and by designers.

Unfortunately for most home woodworking hobbyists, much of this vital information isn't readily available in easy-to-understand form. We're out to change that! In this and upcoming issues, we're going to summarize this data for you. We'll start with Seating and Tables this time, then cover standards for Shelving and Cabinets, Casework, the Workshop itself, Beds, and so forth. We think you'll find this series of articles a valuable reference tool as you pursue your hobby.

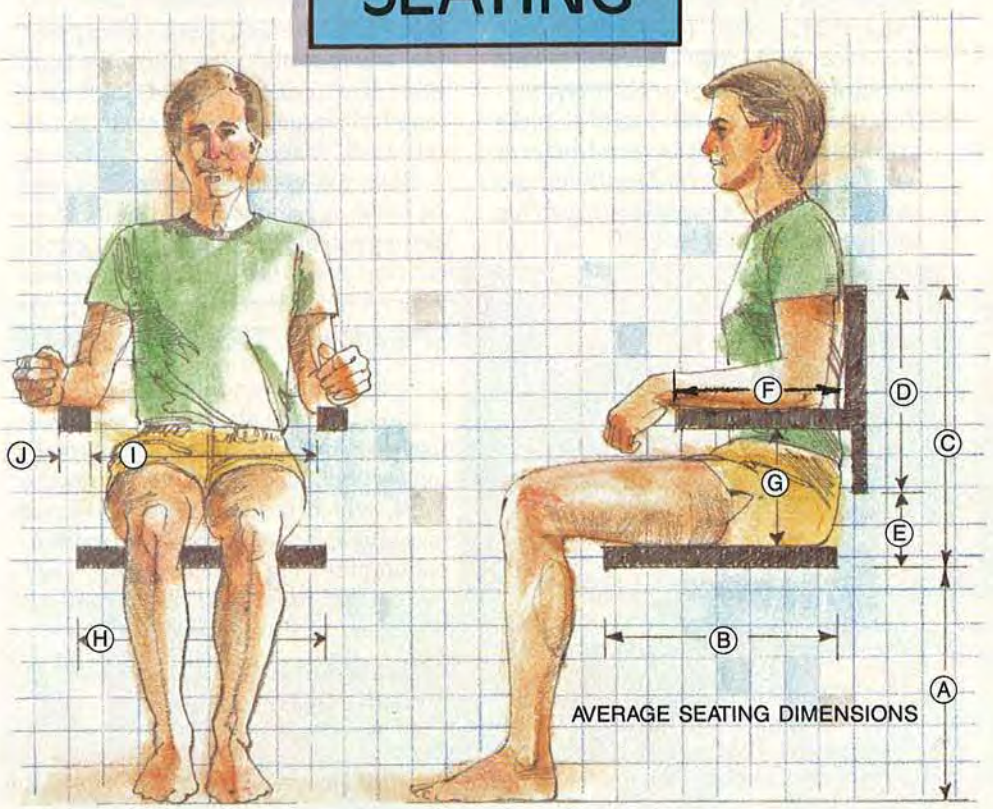
Louis Sullivan once said that, "Form follows function," and this design principle holds especially true in seating. Before considering form—that is, style, scale (or how it relates in size to its surroundings), wood species, or joinery techniques—you must consider comfortable support of the human body.

AVERAGE SEATING DIMENSIONS

The design of a comfortable chair depends on the size and shape of the person it's intended to support. So use the dimensions listed at right only as what they are intended to be—guidelines. You may need to adjust them slightly for your situation, and that's fine.

SEATING ANGLES

You've no doubt noticed that the angle of seating varies from one type of seating to another. Here again, it's function that dictates. *We've categorized all seating into three groupings: Alert, Relaxed, and Reclining.* In the box at the top of the opposite page, we discuss how these postures govern the angles that are right for a given piece of furniture.

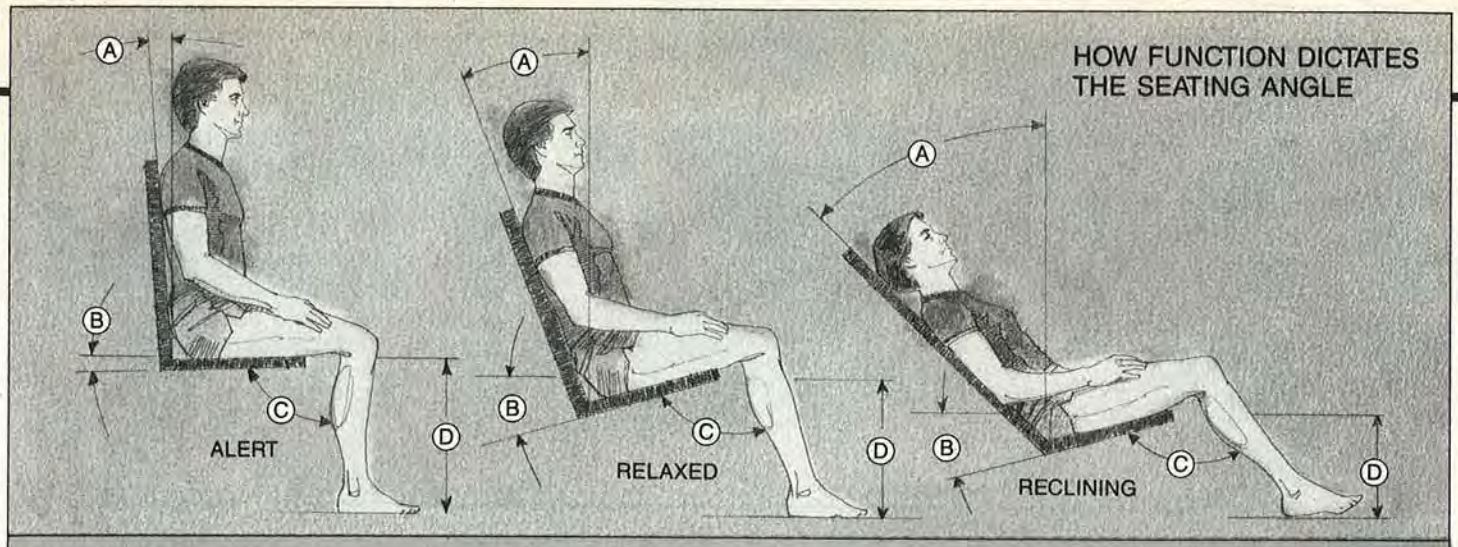


AVERAGE SEATING DIMENSIONS

AVERAGE DIMENSIONS*		ADULT	9 yrs.	7 yrs.	5 yrs.
A	Seat height	16¾"	12¾"	11½"	10½"
B	Seat depth	15½"	11¾"	10¾"	9¾"
C	Backrest height	15"	11"	10¼"	9¾"
D	Backrest	12"	5⅜"	5⅛"	5"
E	Seat to backrest	3" min.	5⅝"	5⅛"	4¾"
F	Armrest length	8⅜" min.	6"	6"	6"
G	Armrest height	8"	6⅝"	6⅛"	5¾"
H	Seat width	16–20"	13"	12"	11"
I	Armrest spacing	18½" min.	14"	13"	12"
J	Armrest width	2" average for all ages			
K	Backrest width	16–18"	11" min. for 9 thru 5		

*All dimensions are for alert posture (dining, writing, etc.). Adult dimensions are for the average American male. Seating designed for the typical American female should be downsized somewhat.

If you use cushions, adjust the dimensions so they are correct when the cushion is compressed by the weight of the occupant. As a rule of thumb, you can deduct half the cushion thickness from the seat height (A).



ALERT: *dining, writing*

- Quite often, the back of the chair runs straight up and down (0°), but it may have a back angle up to 5° to the rear (A).
- Generally, you'll want the back of the seat lower than the front edge. In the instance above, the angle measures 5°; this is fairly typical (B).
- The seat height (C) determines the knee bend angle (D). For dining, the knee bend angle is normally 90°, with an average seat height of 16¾".

RELAXED: *conversation, TV, reading*

- To lean back and relax, you want to factor in a back angle (A) of between 10° to 30°.
- With the back angled this way, you have to angle the seat upward slightly to keep a person from sliding out of the chair. The seat angle (B) ranges from 5° to 10°.
- You always want the knee bend angle (C) to be between 90° and 100°. To accomplish this in the example above, you need to decrease the seat height (D) from the standard 16¾" to 15½", which moves the heel forward.

RECLINING: *lounging, resting*

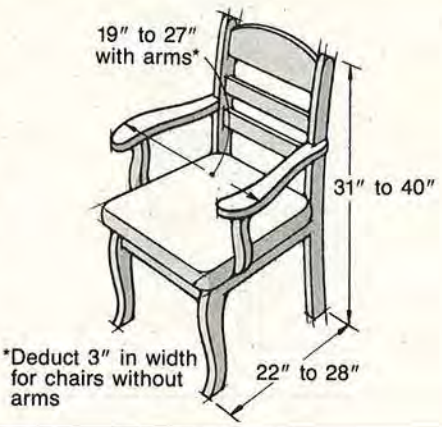
- Back angle (A) varies considerably from piece to piece, but never exceeds 55° to the rear. When it's greater than 30°, you have to provide support for the head. To do this, increase the distance from the seat to the top of the back to at least 32".
- The seat angle (B) ranges from 10° to 15° for lounging purposes.
- You want the knee angle to be from 100° to 120°. We accomplished this above by decreasing the seat height to 14". This again moves the heel forward.

TYPICAL SEATING TYPES

DINING CHAIR

When entertaining, many people consider the dining table the center of activity. So you want to plan as much comfort into dining chairs as possible. Seat cushions help ensure a comfortable stay. We think that a simple foam cushion on plywood makes good sense in most situations. Figure on a 2" cushion being about average.

- The seat height of most dining chairs measures about 16¾", including the compressed height of the seat cushion.

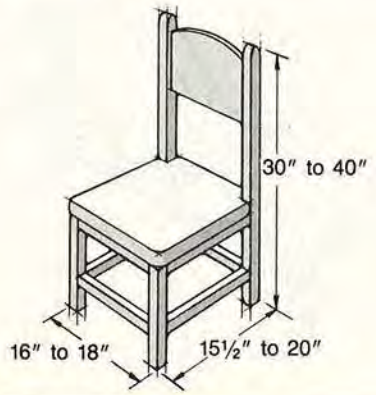


- Armrests on a dining chair add to the comfort factor, too. Most designers plan on a maximum arm height above the seat of 8". But don't forget about the apron height of the table you're planning to use the chair with. You want to make sure the arms will slide under the apron. In any event, you wouldn't want the armrest height less than 6".

DINETTE CHAIR

Compared to dining chairs, dinette chairs are often smaller in scale, mainly because of the limited size of most areas they occupy.

- Normal seat height averages 16¾" and that includes the height of the seat cushion, if used.
- The overall depth of the chair may be as little as 15½" up to a maximum of 20". And the width ranges from 16" to 18", depending on the style of chair being constructed.



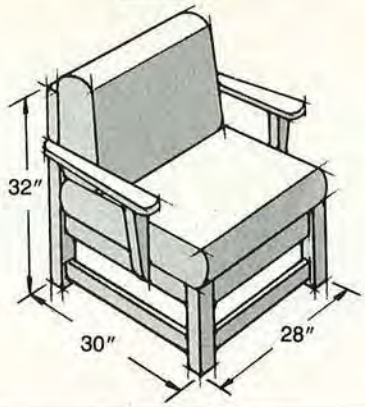
- The style of furniture largely dictates the back height. A low-slung Padova chair, for example, has a back height of only 13½" above the seat, but a ladder-back chair may be as high as 23½".

Continued

EASY CHAIR

Chairs designed for relaxing typically have a lower seat height than those for dining or study. The seat tips back to a greater degree front to back, and the seat back angle increases, too.

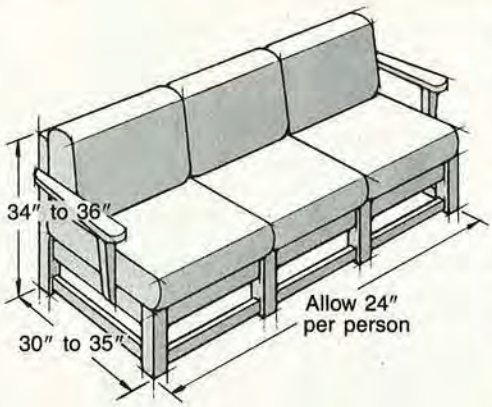
- Seat height averages 16″ and angles front to back at about 10°. With easy chairs, the seat cushion may be quite thick, so be sure to allow for cushion compression when figuring seat height.
- Because the seat is low and angled back, armrests aid in getting into and out of the chair. Typically, they rise 5 to 8″ above the seat and measure between 2″ and 4″ wide.
- This chair's seat back, angled back about 10°, rises 15″ above the cushion. Some high-back wing chairs, though, have backs as high as 33″.



SOFA

To provide the comfort desirable in sofas, you should figure on the seat height being about 15½″ and having it angle to the rear at from 5 to 12°. If the cushions you're using are thick and soft, you can count on cushion compression to create an angle of about 5°. But with firmer ones, you'll want to build the desired angle into the frame.

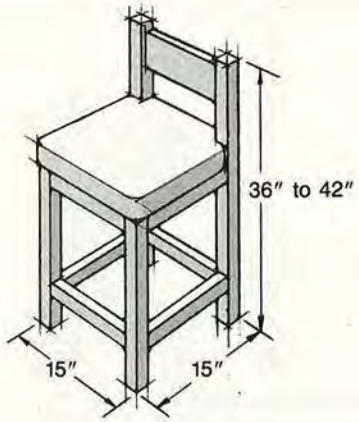
- Seat depth varies, depending on the thickness of the back cushions, but 18″ to 22″ is a good place to start.
- The back, typically 17″ above seat height, usually angles back at least slightly, but can do so up to 25°.
- The armrests most often rise up from 4″ to 8″ above the highest point of the seat cushion.
- In figuring the width of a sofa, allow 24″ per person, plus 4″ to 6″ for each armrest.



BAR STOOL

A bar stool, obviously, must fit the bar with which it's used. Average bar height runs from 40″ to 44″. Whatever its height, you want the seat to be from 12″ to 15″ below the top surface of the bar, but never higher than 30″.

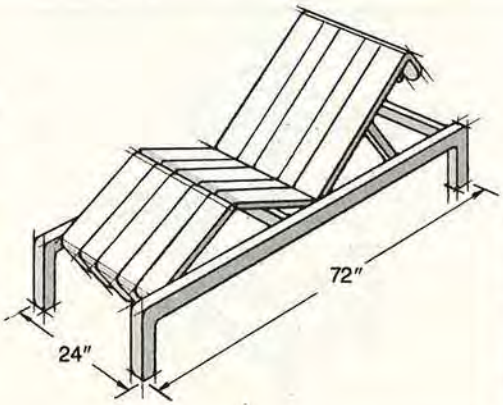
- Bar stools average about 16″ to 18″ square, or 16 to 17″ in diameter if you go with a round seat. Overall dimensions at the base rarely exceed 18″ square.
- The top of the seat back normally is 11″ or 12″ above the cushion. And since people tend to lean forward when sitting in a bar stool, be sure to leave at least 3″ between the bottom of the back and the top of the seat for the person to expand into.
- And don't forget to provide for a place to hang your heels. A rung 20″ below the top of the seat works nicely for this.



OUTDOOR LOUNGE

Three elements combine to create the overall length of 72″—the leg rest, seat, and backrest. The leg rest measures 22″ long and is designed to support the leg from the knee down. It raises along with the seat, creating a knee-bend angle of 120°.

- Seat depth averages 17″ and can be inclined up to 10°.
- Backrest height typically measures 33″. You can adjust its angle backward from 45° to the flat bench position.



Please see page 61 for another 3-page section of Woodworkers' Standards dealing with Tables. You'll learn how to choose a style and a support system, how dining style affects table size, and more.

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Cumulative index for issues 1–8

If you're saving back issues of *WOOD* for future reference—and many of you have kindly taken the time to write and tell us that you are—you'll want to save this index. Pull it out and keep it handy in your shop. We've kept things simple for your convenience. For example, the subject of "hearing protection" is listed as **7**:59, 88. That means you'll find the article in Issue 7 beginning on page 59 and continued on page 88. Because projects are such a popular category, we decided to highlight them in a "mini-index" on page 59 for even quicker reference.

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*Beginning with Issue 4, the latter month of the bimonthly publishing period is the cover date on the issue.

Compiled by Richard Mudrow

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Print this article

WOODWORKER'S STANDARDS

TABLES

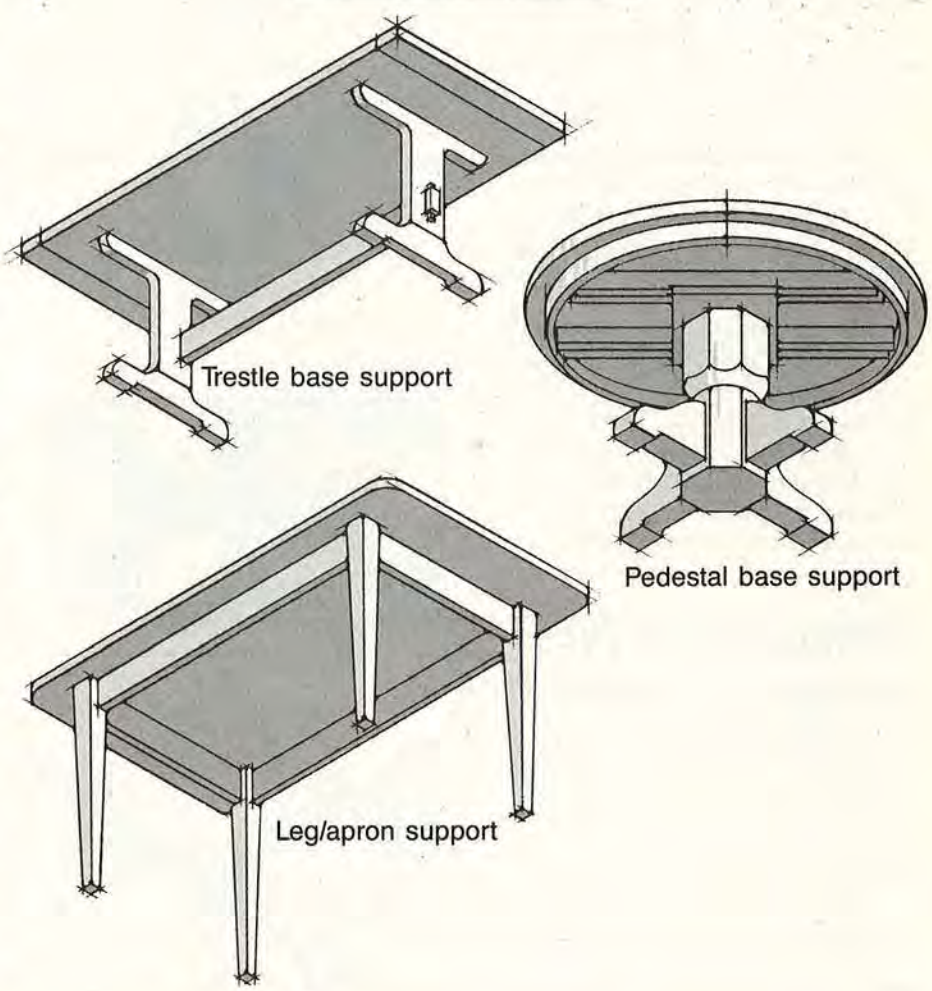
CHOOSING A STYLE AND A SUPPORT SYSTEM

When you set out to design a table, you already know what function you want it to serve. But you also need to select a style that will complement the other furnishings in your home. If you're unsure about which style to choose, stop by some furniture showrooms and browse a bit. Be sure to take along a pad of paper, a pencil, and a tape measure so you can record overall dimensions.

Also take a look at how the table you like is supported. The drawing at right gives you a preview of your options. *Leg/apron-supported tables*, the most popular traditional type, depend on a well-constructed leg/apron assembly for their stability.

Trestle-base tables, a favorite of Early American craftsmen, have two end legs with spread feet connected by a center support member that's usually near floor level. The support structure usually goes together with "through mortise-and-tenon" joints, and are held secure with a wedge, which you can remove for easy disassembly.

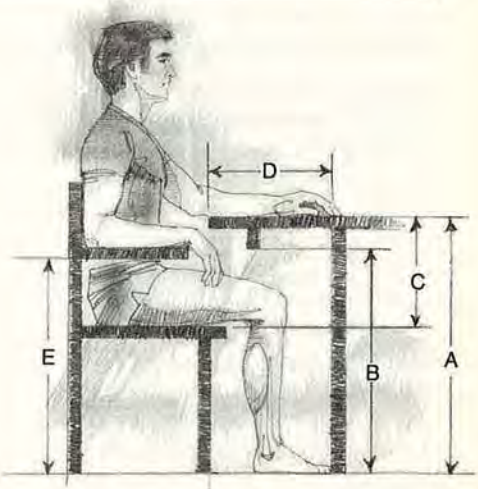
The framework beneath *pedestal-base tables* can take several shapes. Some have a single pedestal with four feet at the base. Others have two smaller pedestals that connect to a split base. And a more contemporary version features a single cylinder without legs.



THE RELATIONSHIP BETWEEN TABLES AND CHAIRS

Any time you pull a chair up to a table or desk, the two must be sized correctly or you won't be comfortable. Keep these pointers in mind as you are designing:

- Most dining tables and study desks have a height (A) of 29".
- The average American male needs a leg space of 25" from the floor to the apron bottom (B).
- Keep the top of the chair seat about 12" to 13" below the top surface of the table (C). Be sure to figure in cushion compression (half the cushion thickness) if you use one.
- If possible, plan a 24" foot space (D) between the edge of the table and the support assembly. With pedestal tables, 18" is all you can get and still have a sturdy surface.
- Make sure the armrest height (E) allows you to slide the chair in under the apron of the table.
- When designing juvenile furniture, plan on a tabletop height of 22½" for 9 year-olds, 21½" for 7 year-olds, and 20" for 5 year-olds. And keep the top of the chair seat about 10" below that.



Continued

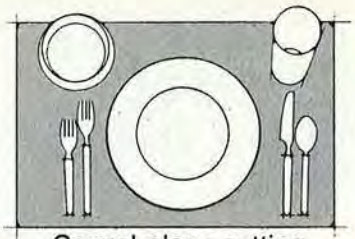
STYLE OF ENTERTAINING AFFECTS DINING TABLE SIZE

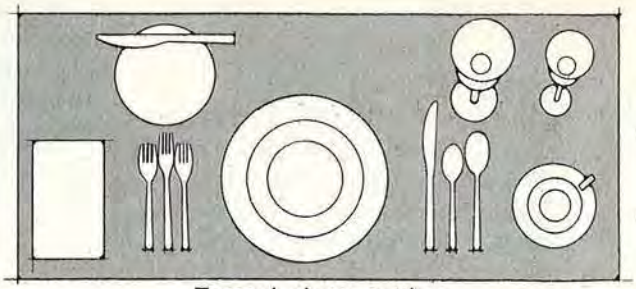
You've all been in dining situations where it seemed that you couldn't make a move without knocking into someone else's elbow or leave the table without having to ask someone to move their chair. These and other space problems can be solved while the table is still on the drawing board.

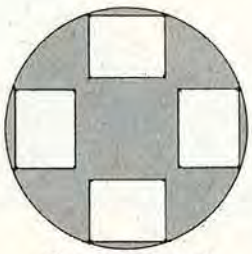
The drawing at right shows how your style of entertaining impacts directly on the space needed to accommodate a group for a meal. Casual dining requires less space, mainly because of the lesser amount of dinnerware used.

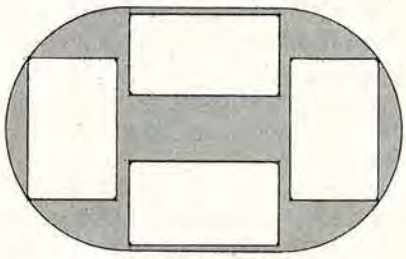
When determining the width and length of dining tables, keep these factors in mind:

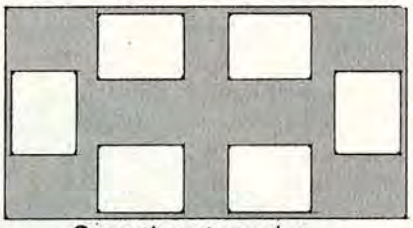
- Allow a 12″ by 24″ space for each casual place setting. For formal tables, figure 15″ by 28″ each.
- Figure in a space of 12″ wide and as long as possible to serve as a serving space.

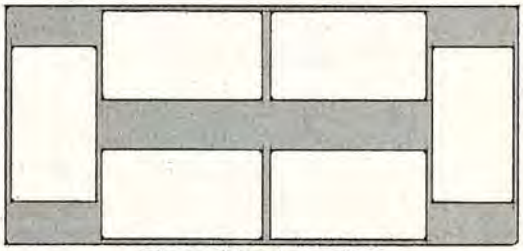

Casual place setting


Formal place setting


Casual round


Formal round


Casual rectangular

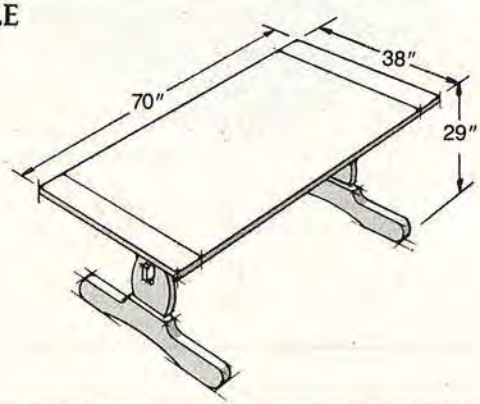

Formal rectangular

TYPICAL TABLE TYPES

RECTANGULAR TRESTLE TABLE

Trestle-design tables have been a favorite of designers for centuries. They're rugged, practical, and fit in well with Early American and country furnishings.

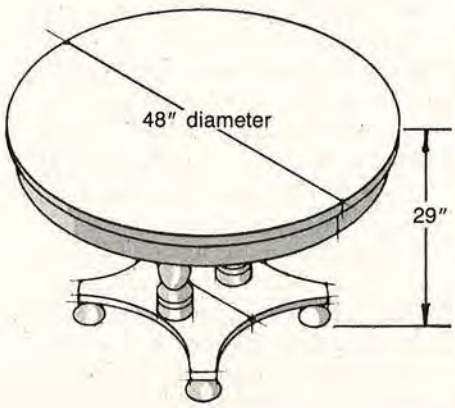
- Make sure that you position the legs at least 18″ in from the ends of the table to provide adequate foot space for the host and hostess.
- The table shown here, a typical example, measures 38″ wide, 70″ long, and 29″ high. Though not many trestle tables extend, on this one, the ends pull out and accept up to two 15″ leaves for a total length of 100″.



ROUND PEDESTAL DINING TABLE (extension type)

This table measures 48″ in diameter and can extend up to 78″. As the tabletop is pulled apart, the pedestal comes apart. This type of table affords you more strength and stability when extended than one with a single base.

- When designing the base, be sure to allow for foot space. Notice how the cutouts between the feet of this table provide adequate clearance.

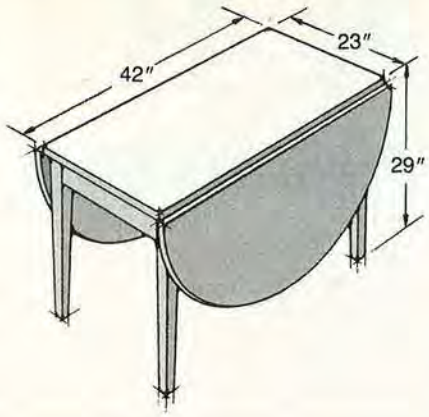


- Another type of pedestal table, the cylinder-base table, typically measures 48″ in diameter with an 18″ base, which allows for leg room and sufficient stability. You can add sand to the base, if desired.

DROP-LEAF EXTENSION TABLE

This style of table continues to be popular, and ease of use and their space-conserving nature could be the reasons why. These tables function especially well in areas too small for other more bulky options. And they adapt quite nicely to use as either a dining table or a coffee table.

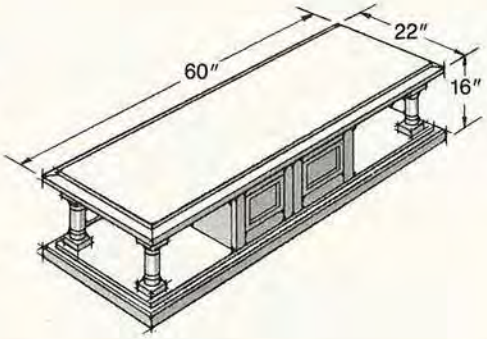
- This table measures 23″ wide and 42″ long with the leaves down, but with the leaves up it measures 42″ in length.
- Drop-leaf tables such as the one shown here are supported at each corner by a leg/apron support structure that provides exceptional stability.



COFFEE TABLE

Though the shapes and sizes of these tables vary considerably, height remains fairly constant at between 16″ and 17″. It should approximate the height of the sofa seat, perhaps an inch or two taller. This table measures 22″ wide, 60″ long, and 16″ high.

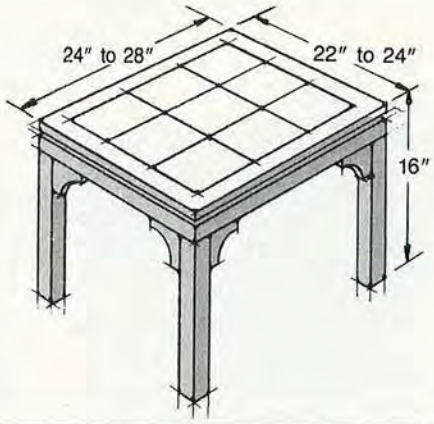
- Widths vary from 19″ to 27″, and lengths range from 36″ to 60″, depending on the length of your sofa. Figure on the coffee table being anywhere from ½ to ⅔ the length of the sofa.
- Round and square tables range in size from 36″ to 42″ across.
- You may want to build in some storage or display space beneath the surface of the table, as in the example shown here.



END TABLE

For an end table to function as it should, it must be at the same height or a few inches lower than the armrest height of the sofa it sits next to. If you plan to set a lamp on the table, adjust the height so the bottom of the lampshade equals the eye height when seated.

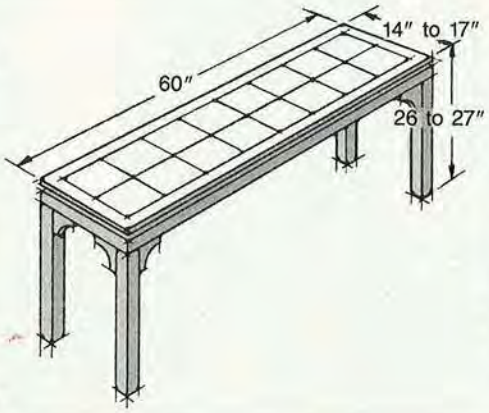
- Most end tables are rectangular in shape and range in width from 22″ to 24″ and from 24″ to 28″ deep. Hexagonal and square tables typically measure from 24″ to 28″ across.
- Depending on the table support system you choose, you may be able to incorporate some storage space in the design.



SOFA TABLE

Sofa tables, those stately furniture pieces designed to sit behind a sofa, usually stand from 26″ to 27″ high, depending on the height of the sofa back.

- These tables' main function is to conceal the back side of sofas that are not against a wall. As a result, most often, they're quite narrow—from 14″ to 17″ wide.
- Sofa tables average 60″ in length, again depending on the length of the sofa. Good scale calls for a sofa table that's approximately ⅔ the length of the sofa.



As space permits in future issues, we'll include other Woodworkers' Standards articles on a variety of subjects. Watch for them!

Produced by James Downing
Illustrations: Advertising Art Studios Inc.; Greg Roberts

YOUR TABLE

EXPANDABLE OAK DINING

IS WAITING!

TABLE SEATS UP TO 8

Print this article

Been scouting for just the right table design to build for your dining area? Then look no further. Made to last, this elegant, yet sturdy, table will serve your family for years to come. Choose the natural beauty of an oak top, or opt for the added durability of laminate. Guests for dinner? No problem! Simply add a leaf . . . or two . . . or three to seat up to eight people comfortably. *P.S.* We'll show you how to build the chairs in the next issue of *WOOD*.

FORMING THE LEGS

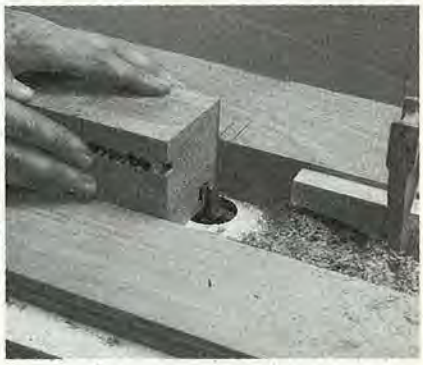
1 To form the four legs, rip and crosscut 12 pieces (A) of 1 1/16" stock 3 1/4" wide by 29" long. Glue and clamp three pieces together for each leg, keeping the ends and edges as flush as possible.

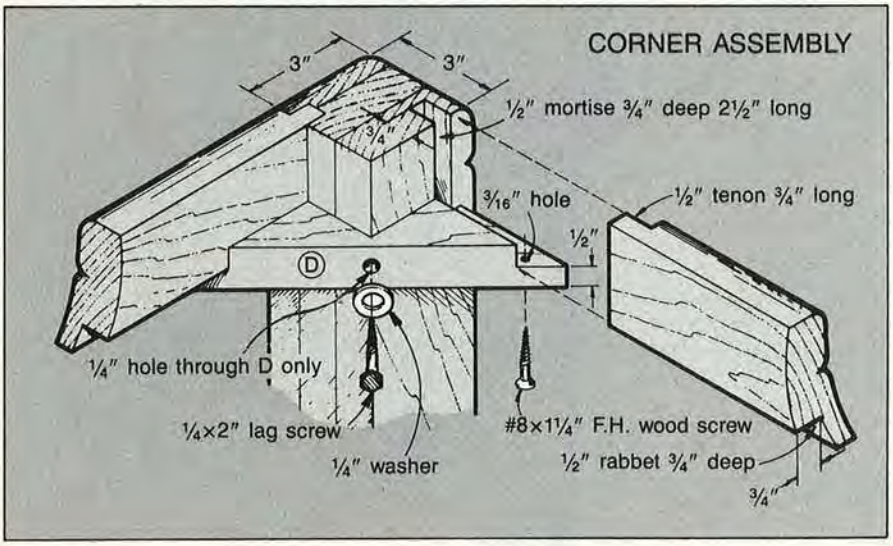
2 After the glue dries, scrape off the excess and plane one of the laminated edges smooth. Set this planed edge against the table saw fence and rip the leg to 3" width. Now, rip 1/4" off either adjoining edge to form a 3×3" square leg. Crosscut the legs to 27 1/2".

3 Lay out and mark the two mortises on one end of each leg as dimensioned in the Corner-Assembly Drawing.

4 Using a drill press with a 3/8" flat-bottomed bit, drill a series of 3/4"-deep holes to remove most of the wood from the marked mortises as shown in photo, *below left*. (We used a back fence and stop, as shown, to ensure that all mortises were consistent in size and position. We also set the stop on the drill press to make sure that all holes were drilled to the same 3/4" depth.) You will be able to drill one of the mortises in each leg with the setup shown. Move the stop block to the other side of the bit, reclamp the stop to the fence, and drill the other mortise in each leg.

5 Using a fence on the router table and a stop block clamped to the fence, rout the mortises clean with a 1/2" straight bit as shown in the photo *below*. You'll be able to rout one mortise on each leg with the setup shown. Move and reclamp the stop block to the other side of the bit, and proceed to rout the other mortises. Using a chisel and mallet, square the rounded ends of each mortise.





BUILDING THE BASE

1 Rip and crosscut the side aprons (B) and end aprons (C) to the size listed in the Bill of Materials.

2 Rabbet the ends of each apron to form 1/2" tenons 3/4" long. (We cut ours on the radial arm saw using a

Instructions continued on page 87

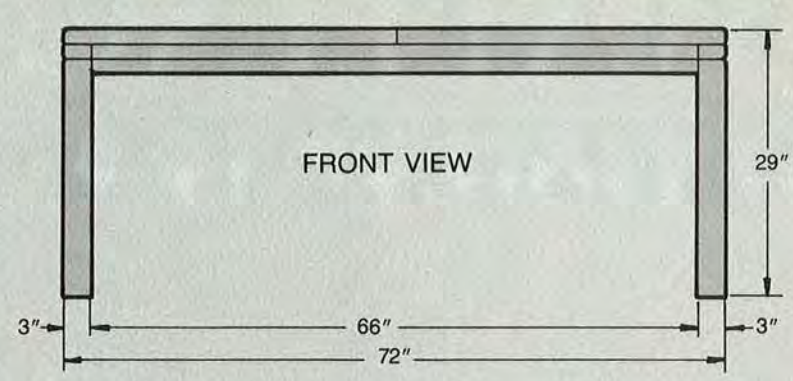
EXPANDABLE OAK DINING TABLE

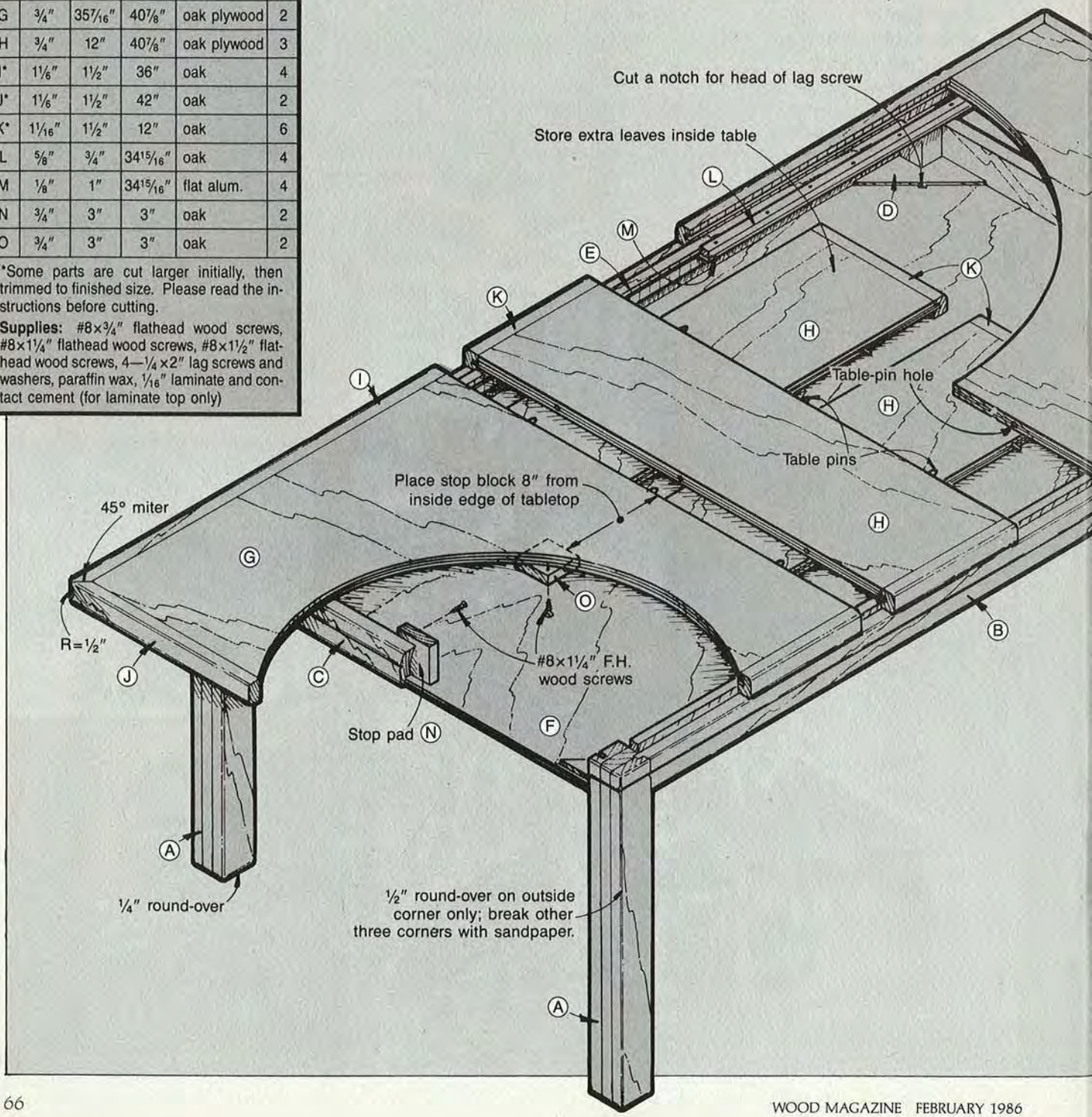
Bill of Materials

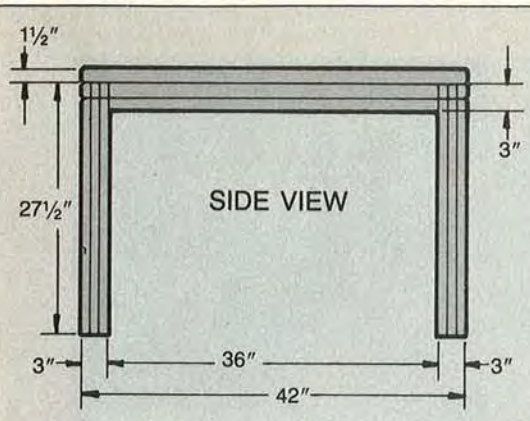
Part	Finished Size* T	W	L	Material	Qty.
TABLE BASE					
A*	1 1/16"	3"	27 1/2"	oak	12
B	1 1/16"	3"	67 1/2"	oak	2
C	1 1/16"	3"	37 1/2"	oak	2
D*	1 1/16"	5"	10"	oak	4
E	1 1/16"	1 1/2"	66"	oak	2
F	1/2"	41 3/8"	71 3/8"	plywood	1
TABLETOP					
G	3/4"	35 7/16"	40 7/8"	oak plywood	2
H	3/4"	12"	40 7/8"	oak plywood	3
I*	1 1/8"	1 1/2"	36"	oak	4
J*	1 1/8"	1 1/2"	42"	oak	2
K*	1 1/16"	1 1/2"	12"	oak	6
L	5/8"	3/4"	34 15/16"	oak	4
M	1/8"	1"	34 15/16"	flat alum.	4
N	3/4"	3"	3"	oak	2
O	3/4"	3"	3"	oak	2

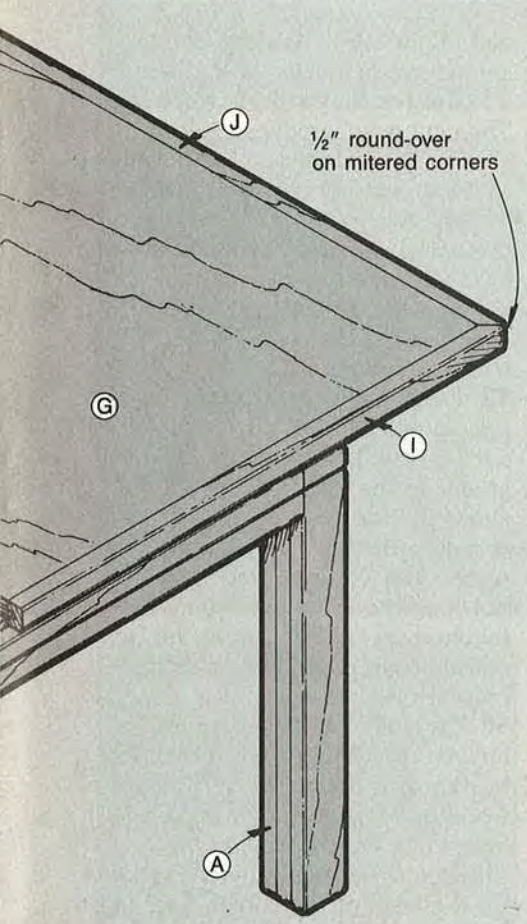
*Some parts are cut larger initially, then trimmed to finished size. Please read the instructions before cutting.

Supplies: #8×3/4" flathead wood screws, #8×1 1/4" flathead wood screws, #8×1 1/2" flathead wood screws, 4—1/4×2" lag screws and washers, paraffin wax, 1/16" laminate and contact cement (for laminate top only)

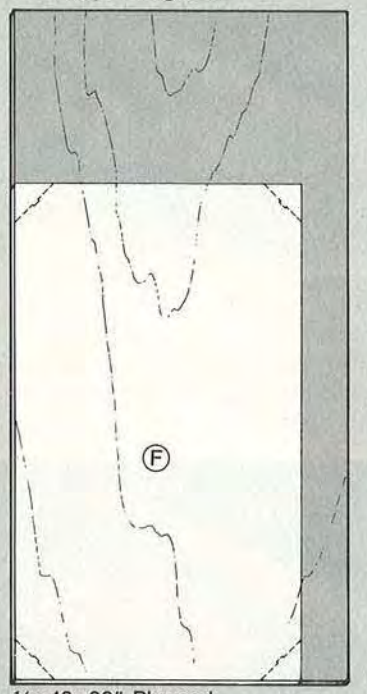




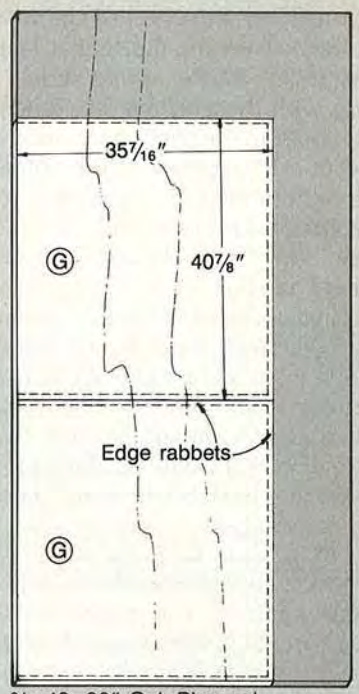




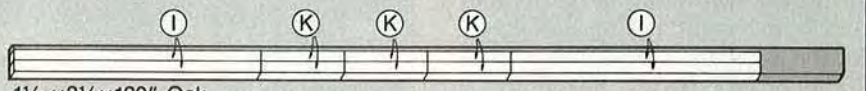
Cutting Diagram



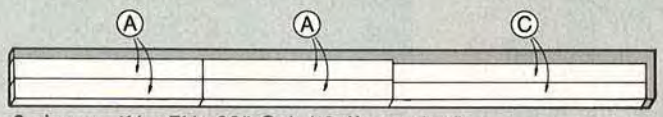
½×48×96" Plywood



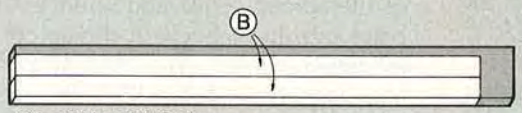
¾×48×96" Oak Plywood



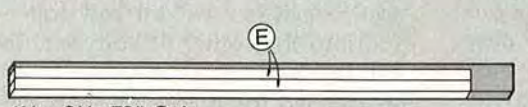
1¹⁄₁₆×3½×120" Oak



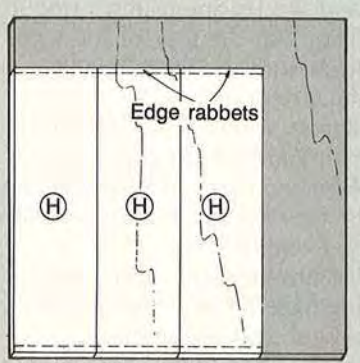
3 pieces—1¹⁄₁₆×7¼×96" Oak (12 A's required)



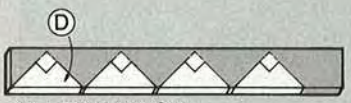
1¹⁄₁₆×7¼×72" Oak



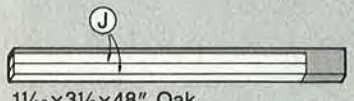
1¹⁄₁₆×3½×72" Oak



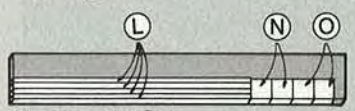
¾×48×48" Oak Plywood



1¹⁄₁₆×5½×48" Oak



1¹⁄₁₆×3½×48" Oak



¾×5½×48" Oak

Continued

dado blade. We test-cut scrap material first and checked the fit of the tenon into the mortises.) The outside face of the aprons should be flush with those of the legs when the tenon is installed in the mortise.

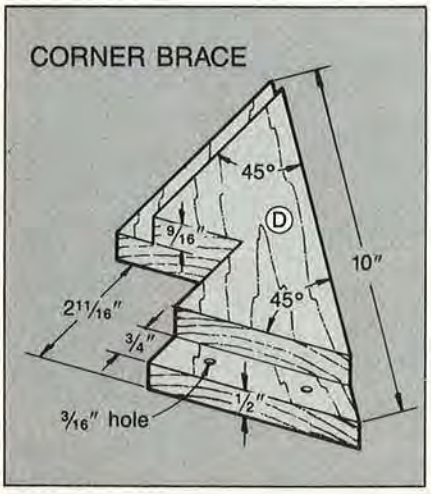
3 Cut a ½" rabbet ¾" deep along the bottom edge of each apron to the size and position indicated in the Corner-Assembly and Section-View Drawings.

4 Glue and clamp the side aprons (B) to the legs, checking for square. Remove any excess glue after it forms a tough skin. After both side assemblies (A, B) are dry, join them by gluing and clamping the end aprons (C) in position, again checking for square.

Note: The table is rather fragile at this point. If you must move it around, do it with care and have a helper.

5 Cut the corner braces (D) to size plus 1" in length, noting the direction of the grain shown in the Corner-Brace Drawing, *below*, to achieve maximum strength. *Don't* cut the notch yet. (We set our radial-arm saw blade at 45° and made one cut on each of the four braces. We then reset the blade to 45° on the other side of center, set up a stop block 10" from the blade, and cut the braces to size.)

6 Using a dado blade, an auxiliary wood fence on the table saw, and a miter gauge, as shown in the photo, *top center*, cut a ¾" rabbet 9/16" deep in one edge of each brace.



To cut the other rabbet in each brace, set the miter gauge at 45° right of center, and push the brace through the blade as shown in the photo, *below*.

7 Notch the four braces (D) to fit around the inside corners of the legs. Drill four 3/16" holes in each brace for the #8 × 1¼" screws. Hold each brace in position in the corner, and drill pilot holes into the bottom of the aprons. Glue and screw each brace into the rabbets in the apron as shown in the Corner-Assembly Drawing. Now drill a ¼" hole through each brace and just into the leg. Switch to a 3/16" bit and drill 1½" into the corner of each leg. Install the ¼ × 2" lag screws and washers through the braces and into the table legs.

8 Sand the leg-apron joints smooth, checking that the tops of the legs are flush with the top edge of each of the aprons.

9 Fit your router with a ½" round-over bit and rout the top edges of the base and down the outside edge of the legs (one edge only as shown in the Exploded-View Drawing).

10 Fit a router with a 5/32" point-cutting ogee bit and edge-guide fence as shown in the photo. Locate the line of cut (1½" from the top edge of the aprons as indicated in the Section-View Drawing). Rout the decorative groove around the perimeter of the base.

11 Cut the slide rails (E) to size. Then cut a 5/32" groove 5/16" deep in both of the slide rails. The bottom of the groove should be 7/16" from the top edge of each slide. The bottom of the groove should also sit level with the top edge of the aprons when installed later, as shown in the Section-View and Sliding-Mechanism Drawings.

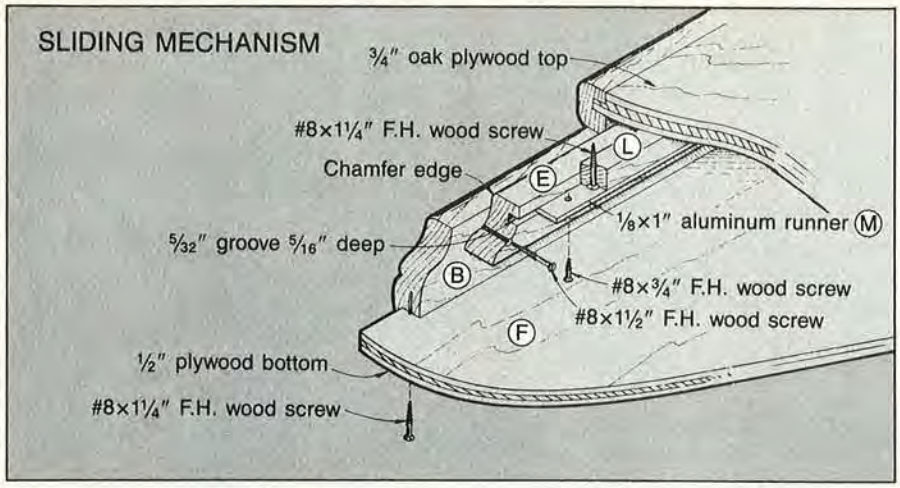
12 Fasten the slide rails (E) to the side aprons with #8 × 1½" wood screws. The bottom of the 5/32" groove in the slide rails must be 1/16" above the top edge of the legs, as shown in the Slide-Rail Detail, *right*. This ensures clearance when installing the aluminum runners in the grooved rails. Chamfer the top outside edge of the slide rails to prevent drag later.

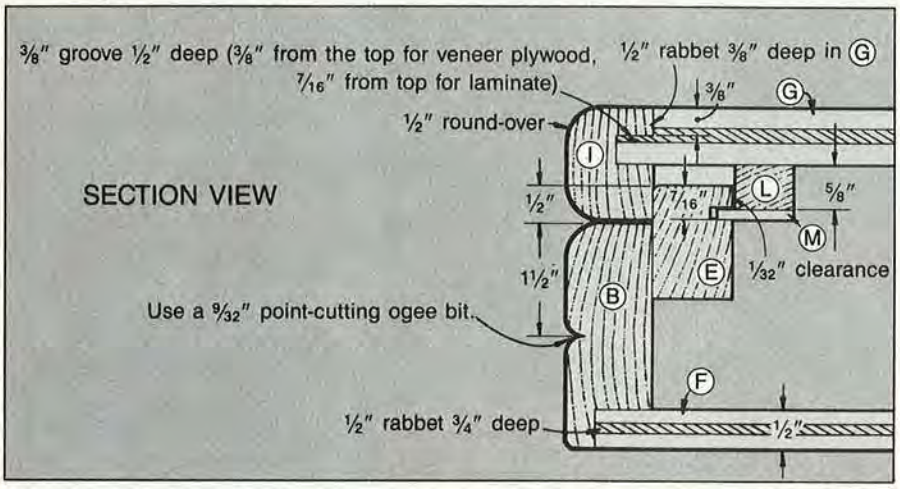
13 Carefully turn the base upside down. Cut the plywood panel (F) to size. Cut the corners of the plywood to accommodate the corner braces (D). You'll need to cut a small notch in each mitered corner for the head of the corner-brace lag screw. Drill pilot holes and fasten (but *don't glue*) the plywood panel to the base to test the fit. Remove the plywood panel; it will be reinstalled later.

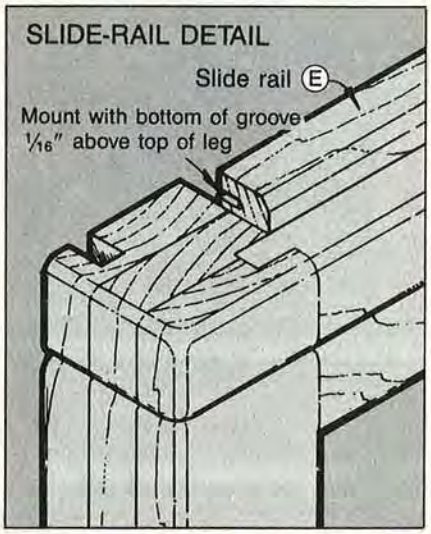
14 With the base upside down, use a ¼" round-over bit to rout the bottom edges of each leg. Sand the entire base assembly smooth.

BUILDING THE TOP AND LEAVES

1 Cut the plywood top panels (G) and leaves (H) to size, as indicated in the Bill of Materials and as laid out in the Cutting Diagram. It is




⅜" groove ½" deep (⅜" from the top for veneer plywood, ⅞₁₆" from top for laminate)
½" rabbet ⅜" deep in Ⓖ
½" round-over
SECTION VIEW
Use a ⁹⁄₃₂" point-cutting ogee bit.
½" rabbet ¾" deep
⅛₂" clearance



important to note the direction of the grain *before* cutting: The grain runs across the table, not the length of it.

2 Cut a ½" rabbet ⅜" deep along three edges of each top panel (G) and along both ends of each leaf (H) to form a tongue, as shown in the Section-View Drawing and Cutting Diagram. (To reduce chip-out, we made the cross-grain cuts first, then those with the grain. We also used a feather board clamped to the fence to keep the oak veneer running flat across the blade.)

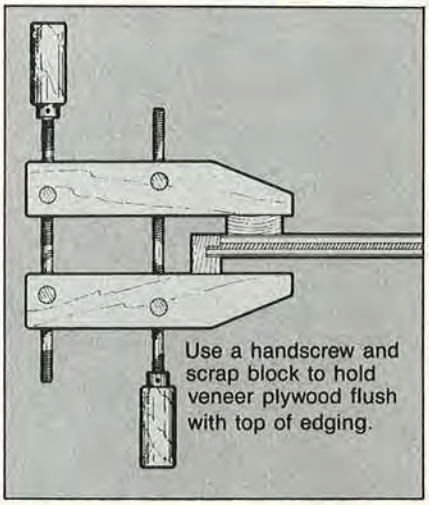
3 Rip the oak edging I, J, and K to 1½", then crosscut the pieces to length plus 2".

4 Cut a ⅜" groove ½" deep along all edging pieces (I, J, K) to accept the tongue on the plywood. Test-cut scrap material first to ensure that the edging fits over the tongue, snugly against the veneer, and, most importantly, flush with the veneer surface of the plywood top.

5 Miter-cut both ends of each J to length. Then miter the mating end of each I piece and crosscut the other ends to length.

6 Glue and clamp the edging to the panels and leaves, checking that the miters pull tight. If the tabletop appears to be higher than the edging in spots, clamp a piece of scrap to the panel and edging, as shown in the drawing *below.*

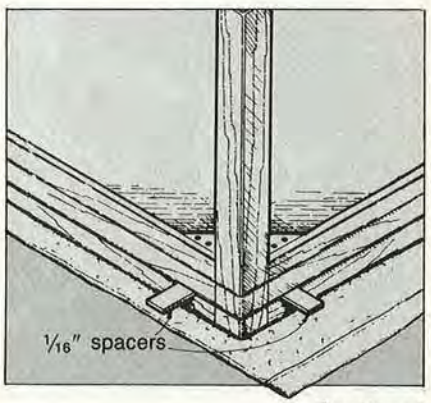
7 After the glue dries, *carefully* remove the excess, and sand or scrape the edging flush with the veneer top. (We used a cabinet scraper and were *extremely careful* not to scrape through the veneer.)



8 Using a ½" round-over bit, rout the outside top, bottom, and corner edges (where the miters meet) of the top sections. *Don't* rout the edges that meet when the table sections close.

MAKING IT SLIDE SMOOTH

1 Position the two tabletop panels (G) face down on a blanket spread on a flat surface (to prevent scratching). Align the halves so that they butt uniformly. Position the base (also upside down) on the panels, and place ⅛₆" spacers between the aprons (B, C) and the edging (I, J) as shown in the drawing, *below.* This



Continued on pg. 87

A JEWELRY BOX OF

Print this article

Beautiful West African zebrawood makes this three-drawer box just as eye-catching as its contents.

Note: You'll need some thin stock for this project. You can resaw your own or order stock. See the Buying Guide for our source.

FIRST, THE CASE

1 Rip and crosscut enough ¼" stock to glue up the case top and bottom (A), sides (B), and back (C). Cut the pieces 1" longer and ¼" wider for trimming to finished size later. Lay out and match the pieces for the best grain pattern; then glue and clamp them as shown in the Edge-Joining Drawing, *below.*

2 Scrape off the squeeze-out and sand the joints smooth. Trim the case top, bottom, and side pieces to finished size.

3 Use a table saw with a dado blade or a table-mounted router with a ¼" straight bit and fence to cut ¼" rabbets ⅛" deep on the back edge of the top and bottom panels (A). Use the same setup to cut the rabbets on the top, bottom, and back edges of the side panels (B).

4 Lay out and mark the position of the dadoes on the side panels (B) where indicated in the Exploded-View Drawing. Use a table saw and dado blade or a router table with a fence and a ¼" straight bit to cut ¼" dadoes ⅛" deep where marked on the side panels.

5 Cut the shelves (D) to size, then dry-fit the case assembly (A-B-D) together. Glue and clamp the case assembly, checking it for square.

6 When the glue has dried, carefully trim the back panel (C) to fit snugly into the case assembly. Glue the back panel in place. Remove the excess glue after it forms a tough skin.

7 Using a router fitted with a ¼" round-over bit, rout all exterior edges of the case *except* the top front edge. (Leaving the front edge square allows the drawer top to fit tightly against the case as shown in the Cutaway Side-View Drawing.)

NOW FOR THE DRAWERS

1 To make the ½"-thick drawer fronts (E), cut six pieces of ¼" zebrawood to 2¼" wide by 10¼" long. Now, glue two pieces together for each drawer front in sandwich fashion, keeping the edges as flush as possible. You'll end up with three ½"-thick laminations.

2 Rip and crosscut the three laminated drawer fronts (E) to finished size (2×10").

Note: Because the drawers are identical in size, we constructed all three at the same time, making the cuts on all corresponding parts before changing our saw or router setup.

3 Using your table saw or router, cut a ½" rabbet ¼" deep on both ends of the drawer fronts (E). Then, cut a 5/16" rabbet ¼" deep on the top edge of each. And, finally, use a router table with a ¼" round-over bit to shape all the outside edges of the fronts.

4 Cut the drawer sides (F), backs (G), and bottoms (H) to size. Cut a ¼" groove ⅛" deep and ⅛" up from the bottom edge of the fronts (E) and sides (F). Also cut a ¼" dado ⅛" deep, ¾" from the back of the drawer sides (F), as shown in the Exploded-View Drawing.

5 Dry-fit the drawer assemblies (E-F-G-H) to ensure a good fit, then glue and clamp them together, checking for square.

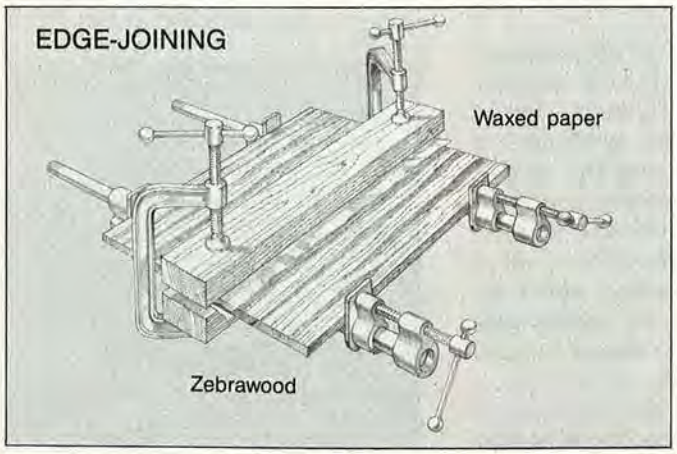
TIME TO FINISH AND ADMIRE

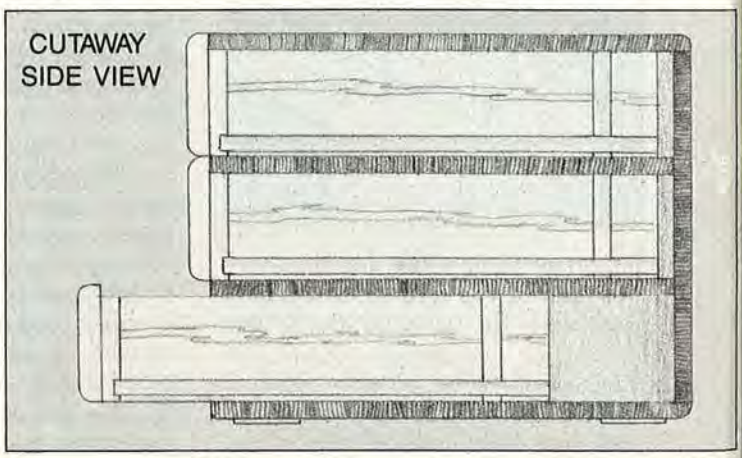
1 Fit the drawers into the case, sanding if necessary for a good fit. Finish-sand the case and drawers.

2 Apply two coats of clear lacquer sanding sealer followed by two coats of gloss lacquer. Don't forget to finish the inside of the box to minimize warpage. [*Tip:* After the last coat of lacquer had thoroughly dried on our jewelry case, we coated the bottom edge of the drawer sides (F) with paraffin wax to ensure smooth gliding.]

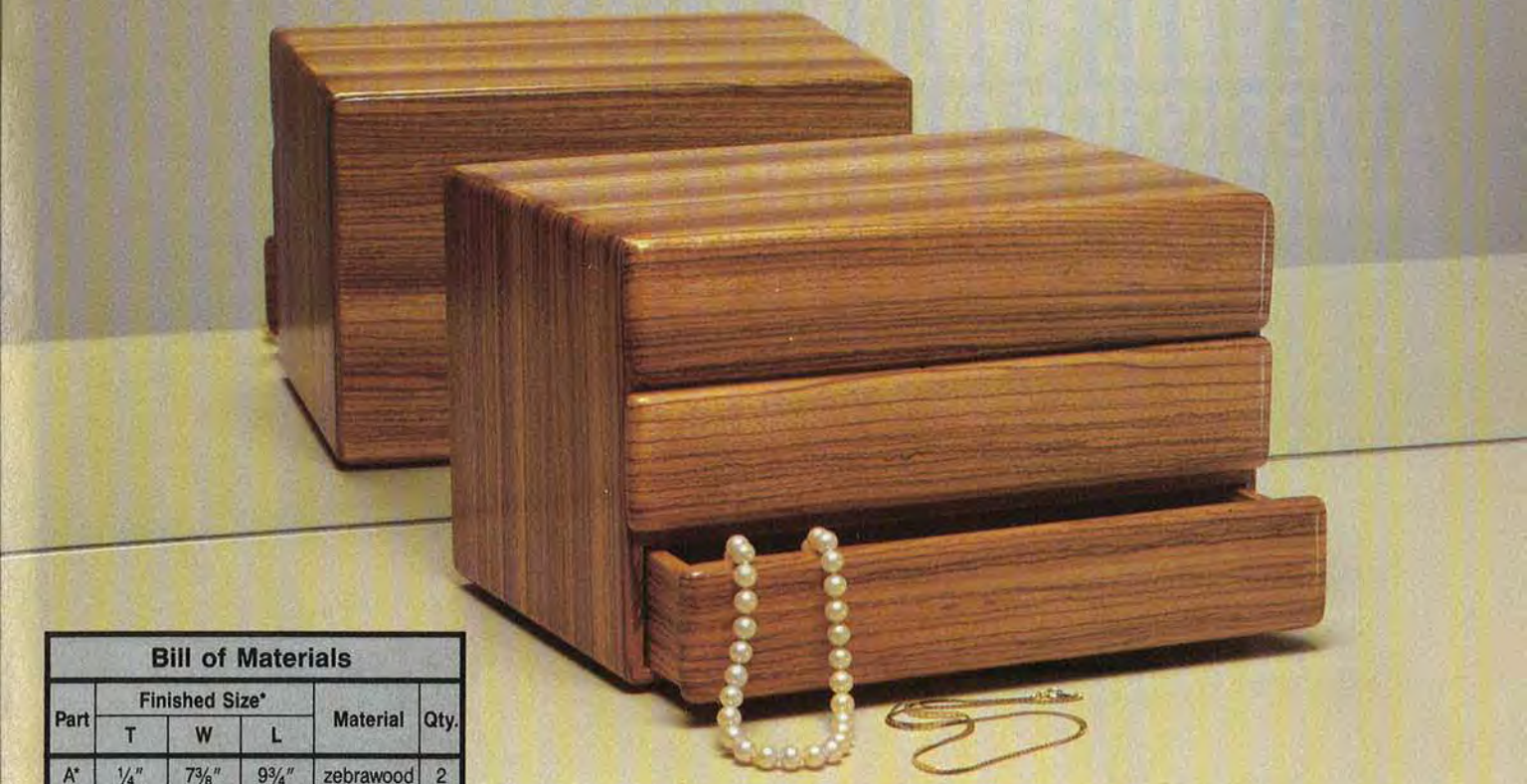
3 Cut the drawer liner fabric and cork foot pads to size and attach them with double-faced tape or spray-on adhesive. Felt would also work fine for the foot pads.

Project Design: James Downing
Photograph: Hopkins Associates
Illustrations: Kim Downing, Randall Foshee





A DIFFERENT STRIPE



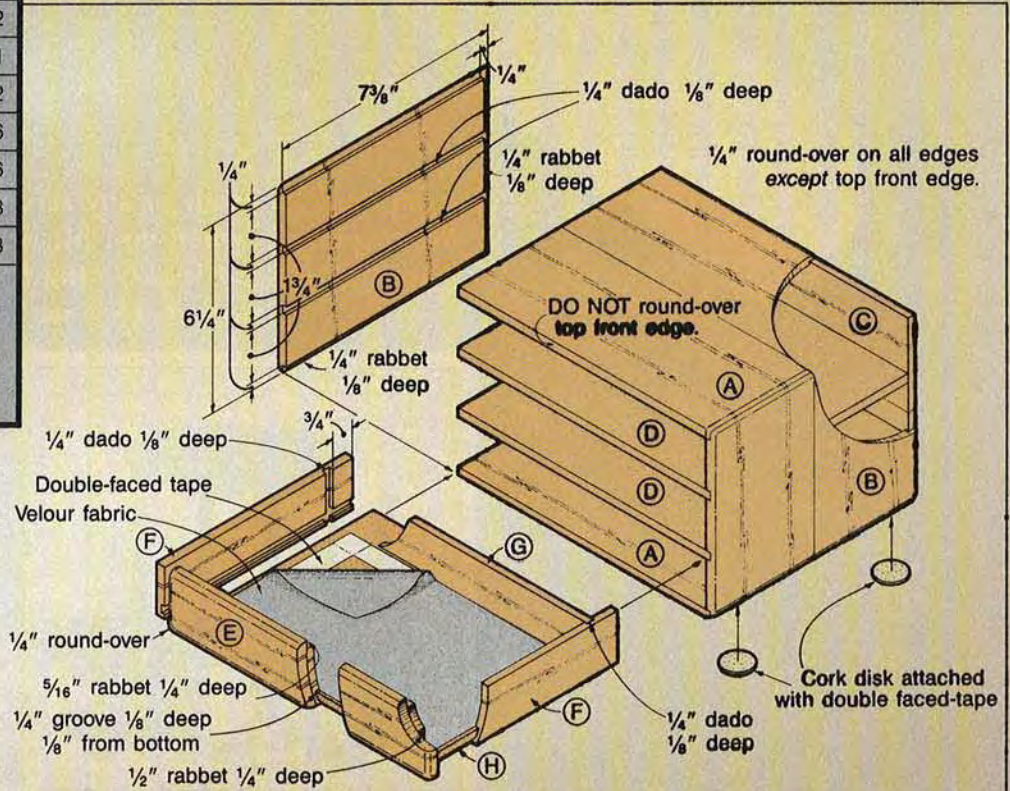
Bill of Materials					
Part	Finished Size*			Material	Qty.
	T	W	L		
A*	1/4"	7 3/8"	9 3/4"	zebrawood	2
B*	1/4"	7 3/8"	6 1/4"	zebrawood	2
C*	1/4"	6"	9 3/4"	zebrawood	1
D	1/4"	7 1/8"	9 3/4"	hardboard	2
E*	1/2"	2"	10"	zebrawood	6
F	1/4"	1 11/16"	7"	zebrawood	6
G	1/4"	15/16"	9 3/16"	zebrawood	3
H	1/4"	7"	9 3/16"	hardboard	3

*Some parts are cut larger initially, then trimmed to finished size. Please read the instructions before cutting.

Supplies: velour fabric, double-faced tape or spray-on adhesive, cork or felt, lacquer sanding sealer, clear gloss lacquer finish

BUYING GUIDE

● ***Zebrawood.*** 1/4" stock, $5.28 per square foot, stock no. W9391. Craftsman Wood Service Company, Dept. W, 1735 W. Cortland Ct., Addison, IL 60101. Or order by phone, 312-629-3100.



OFF WITH THE OLD

A WORKSHOP GUIDE TO FURNITURE STRIPPING

The moment of truth in any refinishing project comes near the beginning, when you lift off the old finish and get your first good look at the bare wood underneath. Look at what we found here!

What's the best way to give the heave-ho to a tired old finish? The answer almost always is with a chemical that interacts with the finish's vehicle, be it the resins in shellac, lacquer, or varnish, or the linseed oil in many paints. Once the vehicle liquefies, you then *gently* lift it off with steel wool, a putty knife, scraper, or, in some cases, with a stream of water from a hose.

The key to success in any furniture stripping project lies with the chemical you choose to do the job, and in applying it properly. Safety is a big factor, too—you're working with toxic substances that can irritate the skin, eyes, and lungs (particularly methylene chloride). Many of the products are highly flammable as well.

Commercial paint and varnish removers will soften just about any finish, but before you rush out to buy a gallon or two, take a few minutes to analyze just what you're dealing with.

First, what exactly is the old finish? Paint is obvious, but you may need to give clear finishes a couple of simple tests. Dab an area with denatured alcohol. If the finish liquefies, it's shellac (you'll know immediately). If it gets soft but doesn't dissolve, it's most likely a mixture of shellac and lacquer.

Now test with lacquer thinner; if it liquefies, the finish is lacquer. To strip shellac and lacquer, you don't need a commercial remover. Instead, just use the appropriate solvent, mixing alcohol and lacquer thinner 50–50 to dissolve a combination shellac/lacquer finish.

If the piece is more than 150 years old and has been painted, you might want to try a third test, this time with ammonia. If ammonia liquefies the finish, it's milk paint, and only ammonia will take it off. Think long and hard, however, about whether you want to remove milk paint. Much of the value of older painted furniture depends on its having the original finish. What's more, ammonia is a dangerous, highly toxic chemical to be working.

CHOOSE YOUR WEAPONS AND PREPARE FOR BATTLE!

Once you've ruled out shellac, lacquer, and milk paint, you can stop testing. Regardless of what the finish might be—varnish, polyurethane, or whatever—you're going to have to invest in a commercial paint and varnish remover.

The chart, *below*, compares the major types of strippers (liquid, semipaste, heavy paste, and water rinse), as well as denatured alcohol and lacquer thinner.

Stripping formulas vary according to the maker and to the jobs they do best. Methylene chloride is the highly toxic substance in most strippers that eats away the old finish. It evaporates rapidly, so strippers also contain waxy additives to slow evaporation. The amount of these additives determines how effective—and also how costly—a stripper will be. In general, the harder the finish and the more layers underneath, the more potent the stripper required and the more likely that you'll need several applications.

Major manufacturers often offer several, if not all, of the strippers, so if you're not having much luck with, say, a semipaste, step up to a heavy-paste remover from the same manufacturer. Don't mix brands, though; some formulations can neutralize others.

Water-rinse strippers are a good all-around choice. They have lots to recommend themselves, with a few drawbacks. Instead of only being able to scrape off the softened finish, you may be able to wash it away with a wet sponge, brush, or steel wool or, better yet, hose it off.

Water-rinse strippers are very effective, easy to use, and nonflammable. Because you're literally floating away the finish, you run almost no risk of gouging the wood. The only trouble is, you really have to flood the surface, and water can stain some woods and peel off veneers. If you decide to use a water-rinse stripper, be sure to thoroughly dry the wood with a soft towel afterward and let the piece air dry for several days.

TYPE	USE ON	SAFETY	HOW TO APPLY
Liquid stripper	Works best on large horizontal surfaces such as tabletops.	Toxic and flammable	Pat on with a brush, let stand for about 15 minutes, and lift off sludge with a putty knife. Liquid stripper evaporates rapidly.
Semipaste stripper	Removes most paints and varnishes, but not effective on polyurethane or epoxy-based finishes.	Some are nontoxic and nonflammable.	Pat on with a brush, let stand, lift off with a putty knife.
Heavy-paste stripper	Effective with many layers of paint, varnish, epoxy, polyurethane, and marine finishes.	Toxic but nonflammable	Pat on, let stand, lift off.
Water-rinse stripper	Removes just about any finish, but don't use on veneers or inlays.	Nontoxic and nonflammable.	Brush on, let stand, then wash off with a hose or sponge. Dry off as quickly as possible.
Denatured alcohol	Shellac. Alcohol can also remove shellac sealers under other finishes, such as varnish.	Toxic and flammable	Brush on, then rub off immediately with steel wool. Work quickly, in small sections at a time; alcohol evaporates quickly.
Lacquer thinner	Lacquer. Mixed 50-50 with alcohol, thinner will remove combination shellac and lacquer finishes.	Toxic and flammable	As with alcohol, brush on and rub off with steel wool, doing small sections at a time.

Continued

STEP BY STEP: BRUSH IT ON, WIPE IT OFF, AND CLEAN 'ER UP

Believe it or not, furniture stripping can be fun, albeit messy, as we discovered when we unmasked the beautiful Honduras mahogany occasional table pictured here and on page 72. The whole process took just a couple hours in our shop, start to finish (see photos, *opposite*).

Chemicals strong enough to dissolve layers of old paint and varnish are toxic, and most are flammable as well, so be careful and protect yourself (see tips, *opposite page*). Methylene chloride fumes pose the biggest health hazard in many strippers: At this writing, several federal agencies are weighing the possibility of restricting its use.

Set up in an open, well-ventilated place, such as a garage, driveway, or patio, but avoid direct sunlight: Heat can quickly dry out stripping agents and impede their effectiveness. If you must work in a basement or other location where ventilation is not especially good, place a fan near floor level. Fumes, which can be highly explosive, tend to settle.

Protect the floor by first spreading out a plastic drop cloth, then laying several thicknesses of newspapers on top. Remove layers of paper periodically as they become saturated with stripper sludge. Cat-box filler, sawdust, and/or wood shavings spread over the papers will help absorb sludge.

Before applying stripper, remove all hardware, handles, knobs, and latches. Drop them in a can partially filled with stripper, and cap it. You needn't totally cover the hardware; the fumes will soften the finish. When you have your piece stripped, grime will wash away.

Now, pour a small quantity of stripper into a metal—not plastic or glass—container. Use old or cheap synthetic brushes and plan to throw them away at the end of the day.

1 *(See photo.)* Brush on a generous amount of stripper in one direction only, and don't go back over an area unless the stripper appears to be drying out immediately. Apply stripper to top surfaces unless you want to test a small, less visible area first. You may want to remove the top entirely in order to treat both sides of the piece—an important precaution if you want to avoid warpage that can occur if only one side is treated.

2 As you reach the bottom of the piece, one at a time, put its legs in a shallow pan to catch any stripper runoff. The time a stripper takes to do its job depends on the product and the old finishes. After the surface begins to wrinkle (up to about 15 minutes, usually), lightly test a small section with a putty knife. If the whole mess comes right off, the stripper has completed its job. If some areas seem to hold fast or pull at the putty knife, wait another 15 minutes or so and try again. If you still don't see bare wood, brush on more stripper.

Remove the stripper sludge from flat surfaces with a wooden or heavy-duty plastic scraper, a spatula, or a putty knife (round the corners to avoid gouging). Hold the scraper at a shallow angle to the surface and aim to *lift*, not scrape off the sludge (see photo, p. 72). Avoid permanent damage from scratching or cutting into the wood fibers with your scraper.

At this point you'll probably be delighted at how effortlessly sludge slides off flat surfaces. Turnings, carvings, and crevices require more patience and ingenuity, however. The first thing you may discover is that remover doesn't cling well to vertical and cylindrical surfaces.

A trick that works for one refinisher we know is to apply stripper; then immediately wrap the part with aluminum foil; the foil helps hold remover against the finish and also retards evaporation. There's also a stripper-impregnated fiber product that does the same job in one step (see manufacturer listing at end of article). Now for the nooks and crannies.

3 Remove sludge from rounded and turned surfaces with medium-fine steel wool, not a scraper; scraping could flatten the wood.

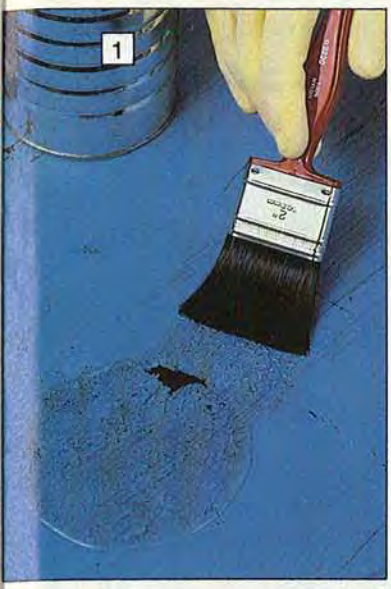
4 To clean out the crevices in turnings, loop a piece of heavy string or thin hemp rope around them and pull it back and forth shoeshine fashion. For slight tapers, make a thick rope of steel wool and use it the same way.

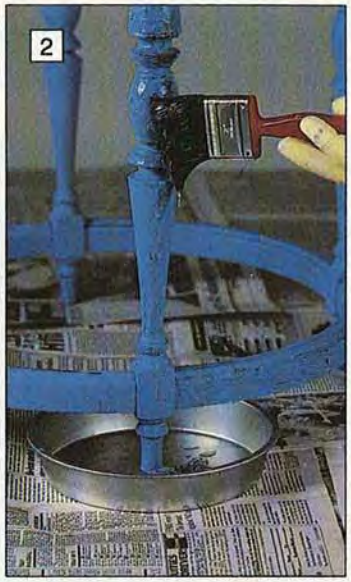
5 Use a toothpick to clean out tight corners, beads, and joints. Carvings are especially tricky, because finish tends to build up in them and because you don't want to damage these important decorative elements.

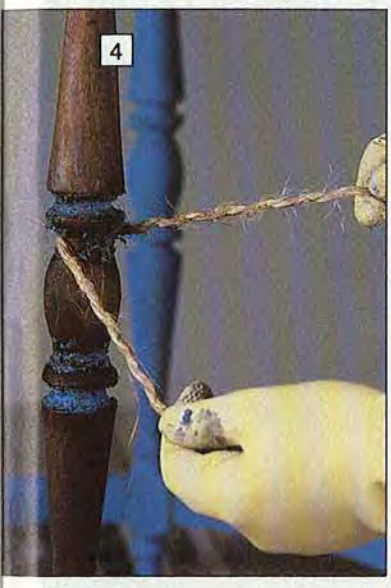
6 You can also use a toothbrush in tight spots. A word to the wise: With delicate carvings (this piece had none), don't use metal tools that could gouge the wood.

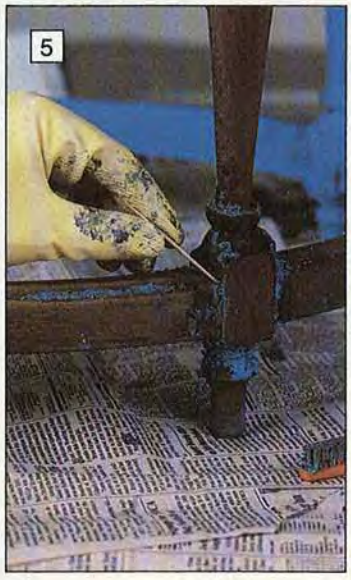
7 After you've removed all the sludge, scrub the stripped piece with sawdust, then a sponge, rag, or with fine steel wool soaked in water or in the solvent recommended by the stripper's maker. Lacquer thinner is the most common. This washdown not only removes any remaining finish, it also neutralizes and flushes away stripper chemicals. If you find clear streaks that seem embedded in the grain, the wood was probably sealed with shellac, which can be removed by rubbing with steel wool dabbed in denatured alcohol.

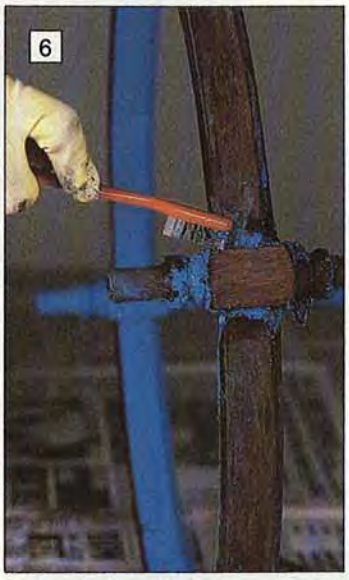
8 Our final step with any project is a washdown with a household cleaner solution like Spic 'n Span or Soilax. Rinse several times, changing water if necessary to avoid discoloring the piece (notice how dark the newly lifted stain appears in our final photo).

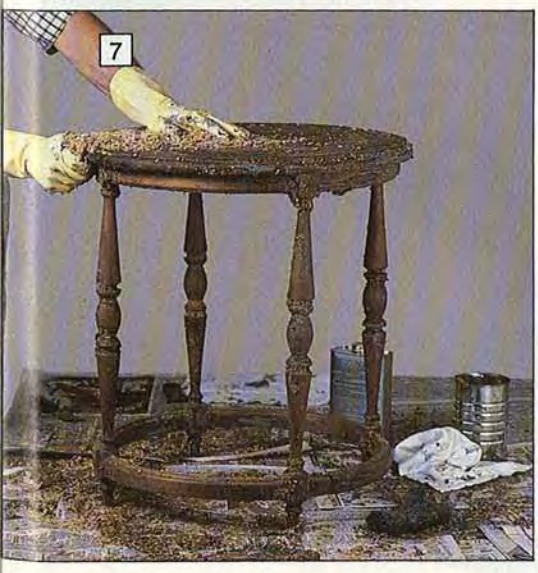












TIPS ON WORKING SAFELY WITH STRIPPERS

Once you've seen what a chemical stripper can do to paint or varnish, you'll want to keep it away from your skin. Wear old clothes, long sleeves, and rubber gloves, and *protect your eyes with safety goggles.* Fumes from strippers can irritate eyes; cause headaches; and, after prolonged exposure, damage throat and lung membranes. Always work in a well-ventilated place and take a fresh-air break every 10 minutes or so. Also keep these pointers in mind:

- Never smoke in a space where stripper is being used, and avoid any areas near an open flame, such as a furnace pilot light.
- Don't drink beverages containing alcohol before or while using a stripper. Not only can alcohol affect your judgment, it may make you more sensitive to fumes.
- Keep children and pets completely out of the area.
- If stripper accidentally splashes onto your skin, wash it off immediately with cool, clear water.
- Don't save old brushes or partially filled jars or coffee cans of stripper. Seal the manufacturer's can (virtually all have childproof caps) and store it in a cool, safe place.
- Dispose of sludge-covered newspapers and other stripping residue as soon as you're finished with a job. Bag them in a plastic garbage bag, seal it well and keep it away from heat (poke a few holes in the bag for ventilation). Spontaneous combustion can result if trash containing stripper lies around very long.
- Read your product's instructions carefully. Not all strippers work alike.

Continued on page 88

READERS, IT'S YOUR TURN! PROJECT

You did it again! We asked you to share your projects with us, and you sent us an array of top-notch woodworking.

Here's just a sampling from the many talented readers across the nation who sent us their project photographs. See how a few of your fellow woodworkers occupy themselves—from an Alaskan carver's sculptured decoy to a Minnesota cabinetmaker's Honduras mahogany display case.

AN INSPIRING WORK

William E. Henderson, 39
Ft. Shawnee, Ohio
Cooperative extension 4-H agent

Undoubtedly, it was his craftsmanship that finally persuaded a local church to have Bill build its altar. But the initial contact with the congregation came through 4-H. The minister's son is a 4-H member. Should it be any surprise that a former 4-H member designed the intricate inlaid wood panels on the altar's front?

Instead of simply inlaying the wood on the front panels, Bill created a "3-D feeling." The cross and the dove, for instance, are ⅛" thicker than the surrounding woods to create a relief surface. After some trial and error, Bill crosscut the walnut on the trees for a leafy look. Variety in grain and color came from crotch-cut walnut, cherry, curly maple, and hard maple, used with the primary walnut.

The altar is finished in tung oil topped with paste wax. Bill, you're an inspiration!

A BIT OF OPTICAL ILLUSION

Steven Hodgson, 32
Northfield, Minn.
Cabinetmaker

Steven took on this elegantly lined display case of lacquer-finished Honduras mahogany for an optical company. The bottom shelf, a mirror, reflects the image of the eyeglass frames displayed on the glass shelves above. You might say that the result is a bit of optical illusion.

The base, which has doors for access to a storage area, was made using frame-and-panel construction. The mahogany stiles cut from one piece are mortise-and-tenoned to the rails. Steven dadoed the stiles so the glass panels could slide into place from above. One stile hides a wire to the light fixture in the top.

Print this article

SHOWCASE

COLLECTIBLES FROM A RARE COLLECTION

Frank M. Knox, 83
New York, N.Y.
Retired management consultant

Some folks collect things to sit around and look at. Not Frank Knox! He collects rare woods and transforms *them* into collectibles. Frank made the finial for this ornately turned, covered bowl from one of the world's rarest woods, pink ivory. The stock came from what was originally a 5′-long, 10″-thick log he found 30 years ago. Frank says the stock "survived better than the five bandsaw blades I wore out cutting it!"

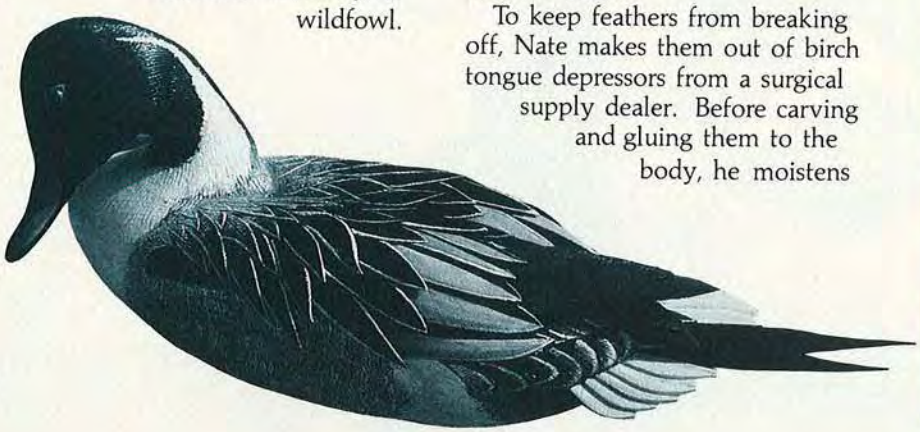
You won't find run-of-the-mill wood in the rest of this turning either: The bowl itself is pernambuco, the stem and base is African blackwood, and the cover is bubinga.

Frank's turning, which he does on a 1853 Holtzapffel ornamental lathe, will be featured in a forthcoming book. Look for it from Prentice-Hall Press, a division of Simon & Schuster.

AN ALLURING DECOY

Nate Silvola, 39
Homer, Alaska
Carver

Nate's half-size decoy may not lure any feathered friends, but as sculpture, it catches our attention. In the two years he's been carving, Nate has done a variety of wildfowl.



Redwood was Nate's choice for this pintail drake. He discovered, however, that among redwood's attributes lies a shortcoming: its brittleness. Preventing the head from breaking off was a problem. The solution was to insert a ¼″ hardwood dowel through the body and into the head.

To keep feathers from breaking off, Nate makes them out of birch tongue depressors from a surgical supply dealer. Before carving and gluing them to the body, he moistens them in his mouth, or in coffee, then bends them to shape.

Nate paints his creations with acrylics, texturing first with a woodburning tool.

To submit your projects . . .
Send a 35-mm color slide, with the project as the focal point and a simple background—no people. Include a capsule description—materials, special joinery, finish, and dimensions, for example. *WOOD* will pay $25 for published projects. Slides cannot be returned unless you enclose a self-addressed, stamped envelope.

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WOOD magazine
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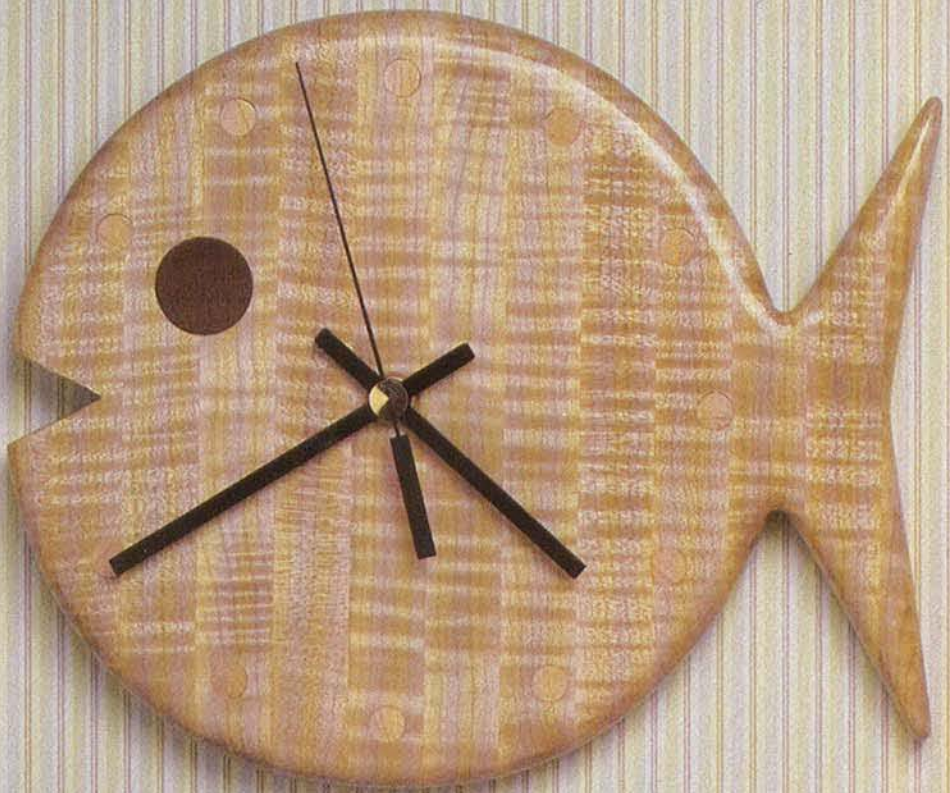
Des Moines, IA 50336

Time and Time

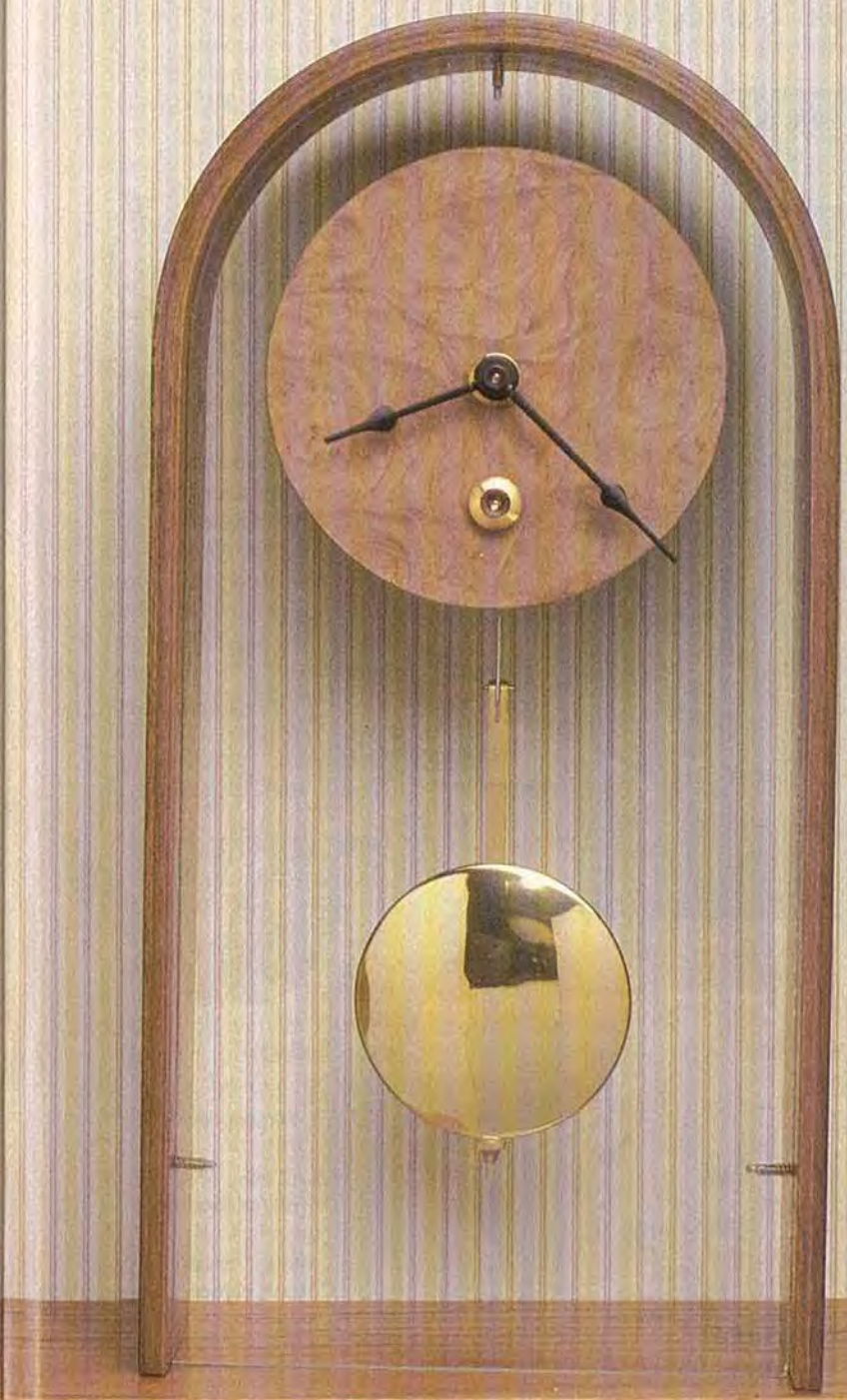
3 great clocks to build



Haven't built a clock before? It's never too late to start. Don't worry about the mechanical parts—you can order them from the sources listed in the Buying Guide. Choose from a cozy, old-time mantel clock, a just-for-fun wall clock, and a strikingly simple pendulum clock. Each requires different woods and techniques to build, so pick your favorite and head for the shop—time's a wastin'!

Print this article

Again



See-Through Pendulum Clock

The choice just wasn't clear: Some of us liked the clock movement showing; others preferred the burled-veneer face. Either way, the laminated walnut veneer shell used in both clocks couldn't be more "striking." But beware—the clever veneer-bending form and the circle-cutting jig are almost as fun to build and use as the clocks themselves are!

Note: Build the exposed-movement clock the same as the burl-faced canister clock, with one exception: You'll need a second piece of acrylic positioned flush with the back edge of the laminated shell. This second piece forms a dust barrier for the exposed movement and supports the chime. The movement used with the burl-faced clock has no chime.

LAMINATING THE VENEER

1 Build the bending form as shown in the Bending-Form Drawing and to the dimensions listed in the Bill of Materials. Glue the form body (A) together, and screw (don't glue) the base (D) to the form body for removal later. Mark a centerline at the top of the completed form as shown in the drawing.

2 Rip and crosscut 12 pieces of veneer (F) to 4″ wide by 32″ long. Mark a centerline 16″ from either end on the top of the best piece for the top layer.

3 To ensure successful gluing later, place the pieces on the form without glue, and check that the veneers fit snugly between the form and the dowel mounted in the bending levers.

Depending on the precise thickness of your veneer (it varies), you may need to add or subtract a piece of veneer for a tight fit. By placing the piece with the marked centerline on top and aligning it with the top center of the form, the veneer should sit centered on the form, not

Continued

quite reaching the base (D) on either side. Note the gap between the ends and the base for reference later when laminating.

4 Cover the form with waxed paper, and have sliding-head clamps at the ready. Mix the epoxy and apply it to one side of each piece of veneer except the top piece. (We placed the epoxy in a paint tray. We then used a disposable 3″ roller for applying the epoxy and wore disposable gloves.)

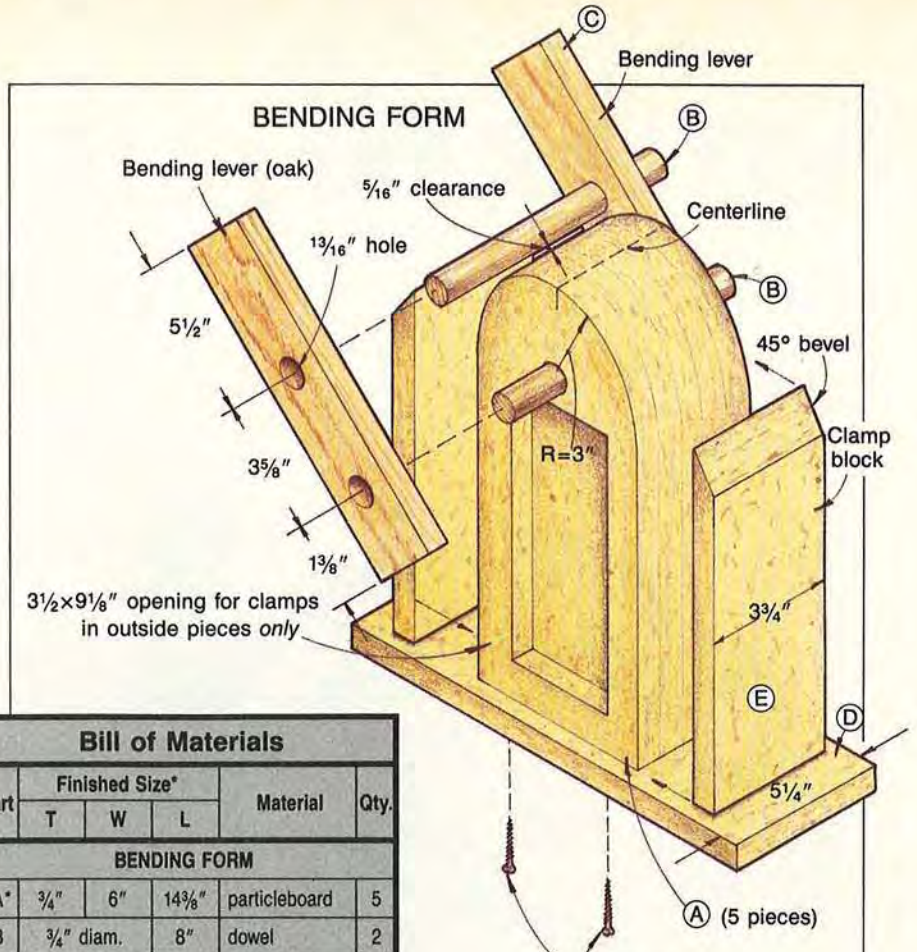
5 Center the veneer stack on the form, leaving the predetermined gap between the base and the ends of the veneer. Position and clamp one of the clamp blocks (E) and waxed paper to the form, sandwiching the veneer in between. (When clamping the veneer, we tried to keep the veneer edges as flush as possible.)

Install the dowels (B) in the bending lever and form. Starting on the same side as the clamped block (E), pull the veneer over the top radius of the form as shown in the photo, *below*. The bending levers and dowel will squeeze out excess epoxy and trapped air. Clamp the other clamp block and waxed paper to the form.

6 Let the veneer lamination dry on the form overnight, then remove the clamps and waxed paper. Remove the lamination from the form, then unscrew the form body (A) from the base (D).

7 Lay the form body (A) horizontally flat on a work surface, and clamp the lamination back onto the form, with one edge of the lamination about ⅛″ above the form. Now clamp the whole works onto a

Pendulum clock continued on page 90

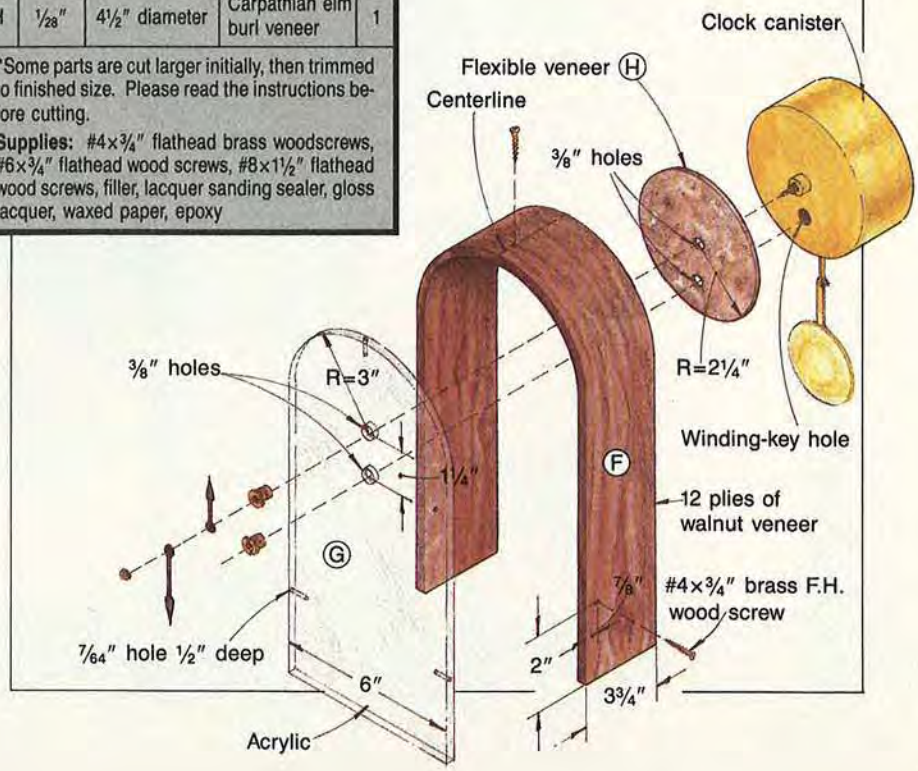


Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
BENDING FORM					
A*	¾″	6″	14⅜″	particleboard	5
B	¾″ diam.		8″	dowel	2
C	¾″	1¾″	10½″	oak	2
D	¾″	5¼″	12½″	particleboard	1
E	¾″	3¾″	11½″	particleboard	2
CLOCK					
F*	1/28″	3¾″	30¼″	walnut veneer	12
G*	¼″	6″	12¾″	acrylic	1
H	1/28″	4½″ diameter		Carpathian elm burl veneer	1

*Some parts are cut larger initially, then trimmed to finished size. Please read the instructions before cutting.

Supplies: #4×¾″ flathead brass woodscrews, #6×¾″ flathead wood screws, #8×1½″ flathead wood screws, filler, lacquer sanding sealer, gloss lacquer, waxed paper, epoxy



Art Deco mantel clock

Just about everyone who's passed this clock in our offices has paused to admire it. Yet, it's almost embarassingly fast and easy to make. We won't tell if you don't. . . .

BUILDING THE CLOCK BODY

1 Lay out and mark the oak front (A) and walnut back (B) as shown in the Half-View Grid. Also cut the base (C) to the size indicated in the Bill of Materials.

2 Cut pieces A and B to shape with a band saw or jigsaw. Using a hole saw, bore a 3⅜" hole through A (you could also drill a hole large enough for your jigsaw blade, and cut a 3⅜" hole). Drill a 7/16" hole in B for the clock shaft.

3 Rout the front edges of A and B and the top edges of C with a ⅜" round-over bit. Drill and countersink two 3/16" pilot holes through the base where dimensioned in the Exploded-View Drawing.

4 Position the clock movement on the back side of the walnut back (B) with the clock shaft in the 7/16" hole. Trace the outline of the clock on the back of B. Using a large diameter flat-bottomed bit, drill ⅝" deep holes to form a recess slightly larger than the drawn outline to house the clock movement. Check the fit of the clock in the recess, and make sure that enough of the threaded shaft protrudes through B to fasten the shaft nut to.

MAKING THE HANDS

1 Resaw scrap oak stock to 1/16" thickness. (We cut enough thin stock for a few extra hands. It's a lucky thing we did because we broke one when drilling in a later step.) Stiff veneer stock will also work for the hands.

2 Using tracing paper and the full-sized patterns, trace the hands and hole positions onto the thin oak stock. Drill holes in both hands to fit the clock shaft.

3 Cut the hour hand (D) and minute hand (E) to length and sand to shape.

FINAL ASSEMBLY

1 Finish-sand all clock parts, using extra care when sanding the hands.

2 Glue, clamp, and screw the back (B) to the base (C), then glue and clamp the front (A) to the base and back. Remove the excess glue.

3 Remove the clamps and do any touch-up sanding necessary. Finish the clock body and hands as desired (we sprayed on several coats of lacquer).

4 Install the clock movement, and *carefully* attach the hands.

Bill of Materials

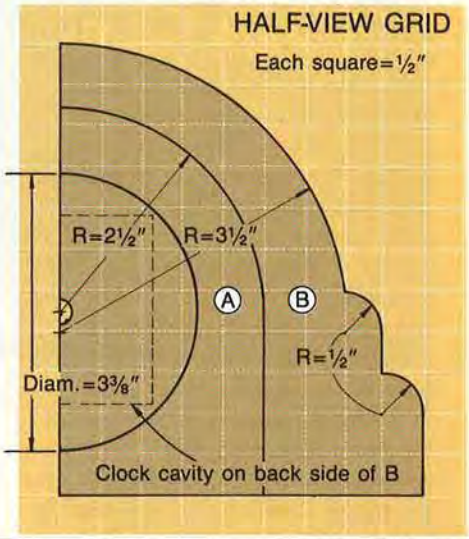
Part	Finished Size T	W	L	Material	Qty.
A	¾"	5"	4¾"	oak	1
B	¾"	9"	5½"	walnut	1
C	¾"	2¾"	9¾"	walnut	1
D	1/16"	⅜"	1¼"	oak	1
E	1/16"	⅜"	1¾"	oak	1

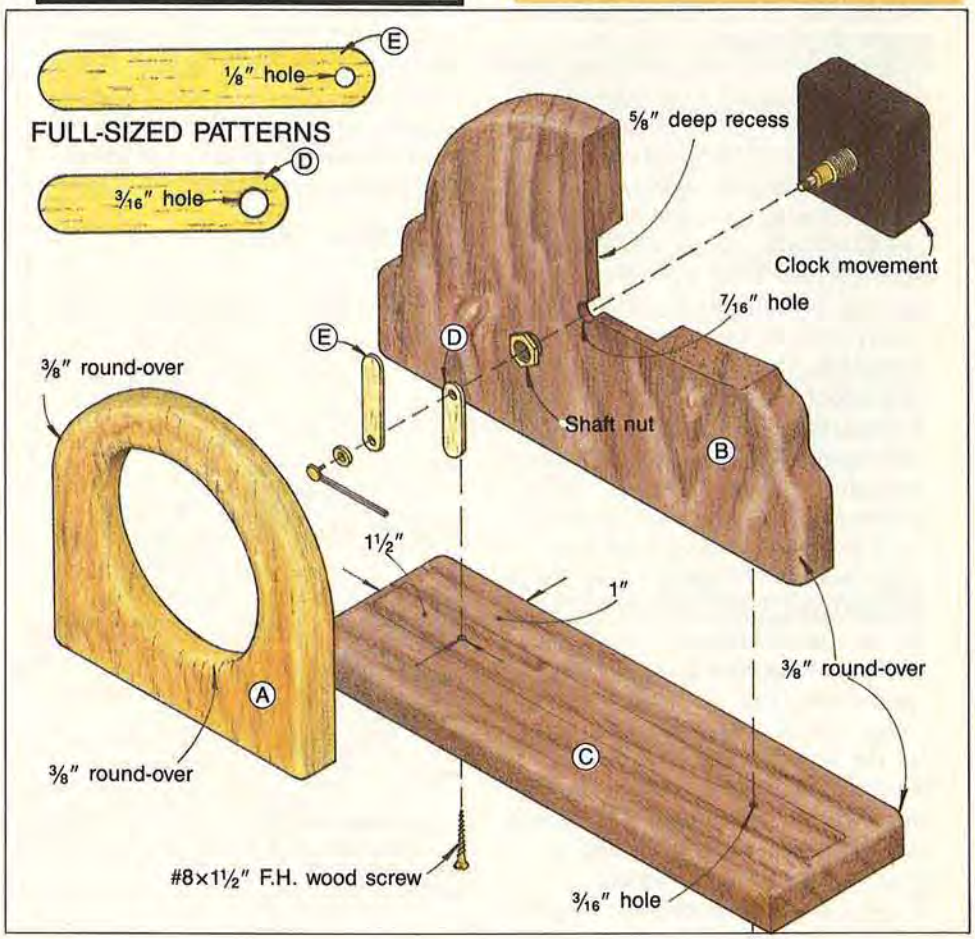
Supplies: #8×1½" flathead wood screws

BUYING GUIDE

● ***Thinline quartz movement.*** ⅝" thick with a short shaft. Catalog no. M88SP, $6. Kas-Ker Company, P.O. Box 14069, Cincinnati, OH 45214. Or call 513-241-7073.

Project Design: Ralph Peterman
Photograph: Hopkins Associates
Illustrations: Kim Downing; Bill Zaun





Prize catch
Angelfish Clock

The things you can do with wood! By laminating curly maple with the edge grain up, we achieved a luminous look similar to that of a real fish.

LAMINATING THE CLOCK

1 Using ¾" curly maple, crosscut one 8"-wide piece 18" long. Then rip seven pieces ¾" wide from it. Now crosscut the 18" pieces in half. You should now have 14 pieces measuring ¾×¾×9".

2 With the edge grain up, glue and clamp the pieces to form a rectangular lamination measuring 9×10½". Keep the surface of the lamination as flush as possible when clamping. After the glue dries, scrape off the excess, and belt-sand both sides smooth.

3 Using the dimensions listed on the Front-View Drawing, lay out and mark the shape of the fish on the maple lamination. The lamination is extra large so you'll have excess on all edges.

4 To mark the position of the hour marks, use a compass to draw a circle with a 3¼" radius from the centerpoint. Bisect the centerpoint at 90° with two lines, one vertical and one horizontal, to mark 3, 6, 9, and 12 o'clock. Using a compass with the lead 1¹¹⁄₁₆" from the compass point, mark the points on the drawn circle to locate the position of the other hours. Now mark the location of the fish's eye.

5 Drill ⅜" holes ¼" deep for the hour marks. Then, drill a 7⁄16" hole through the center of the 4" radius to accommodate the shaft of the clock movement. Switching bits again, bore a 1" hole ¼" deep for the fish's eye.

6 Use a plug cutter to cut a 1"-diameter walnut plug 5⁄16" thick for the fish's eye. Using a ⅜" plug cutter, cut 11 maple plugs 5⁄16" thick for the hour marks. If you don't have plug cutters, substitute dowel stock (remember though, the dowel stock will show end grain and a plug will show surface grain).

7 Glue the walnut eye and maple hour marks in place. Sand the walnut and maple plugs flush.

8 Position the clock movement on the back of the lamination with the shaft inserted into the hole. Trace the outline of the clock onto the back of the lamination. Using a 1"-flat bottomed bit (we used a Forstner) bore several holes ⅝" deep to form the recess to house the clock.

Bore the recess slightly larger than the outline drawn. Clean out the corners and rough edges with a chisel and mallet. (You could also use a router, template, and straight bit to form the recess.) Check the fit of the clock in the recess and the shaft through the hole.

FORMING THE SHAPE

1 Using the guidelines shown on the Front-View Drawing, mark and drill ¼" holes at the intersection of the body and tail. These two holes create a smooth ⅛" inside radius.

2 Using the lines previously drawn, cut the fish to shape. Then sand the tips of the tail to shape. (We taped sandpaper to a small-diameter dowel and mounted this in a hand drill to sand the small radii where the tail meets the body.)

3 Fit your router with a ⅜" round-over bit, and rout the top edge, *except* the fish's mouth.

FINAL ASSEMBLY

1 Finish-sand the clock. If you notice small gaps around the hour marks, inject a small amount of glue into the crack and wipe off the excess with a wet finger. Pack the glue-filled crack with fine maple sawdust with your finger (dry this time), and then continue to sand. The dust will fill the crack and make it nearly invisible.

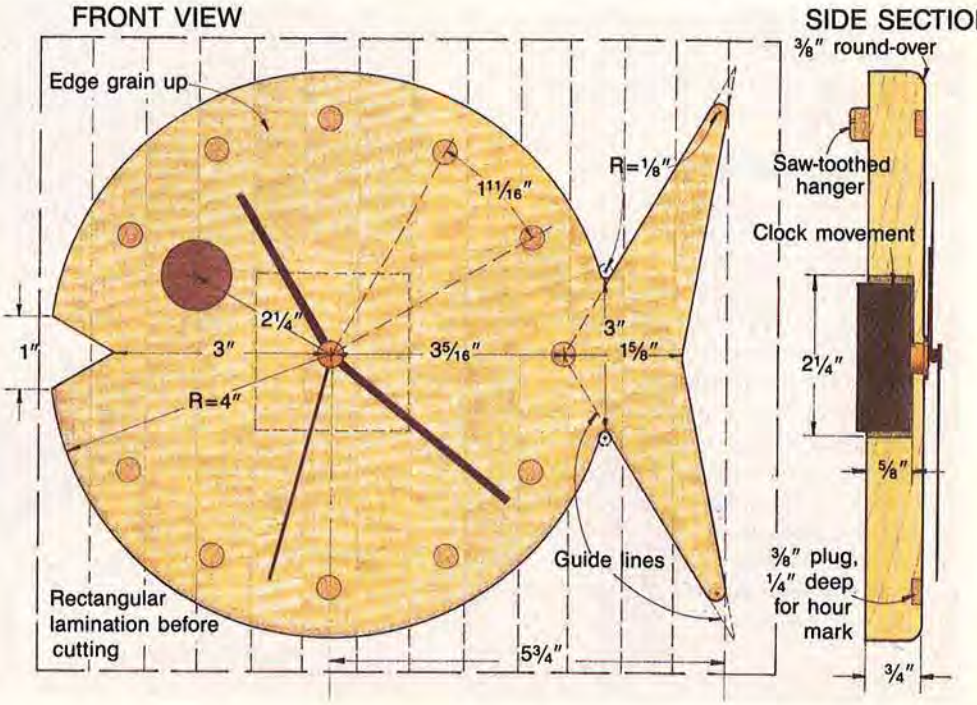
2 Apply the finish. (We used two coats of gloss lacquer to highlight the curly grain of the maple.)

3 Attach a saw-toothed hanger, the clock movement, and the hands. Hang the clock, and show off the one that didn't get away.

BUYING GUIDE

● ***QC09 quartz clock.*** 2¼" square, short shaft, $5.80. Precision Movements, P.O. Box 689, 2024 Chestnut St., Emmaus, PA 18049. Or call 215-967-3156.

Project Design: James Downing
Photograph: Hopkins Associates
Illustrations: Kim Downing; Bill Zaun



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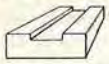
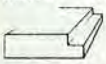


STRAIGHT BIT TWO FLUTE

PART #	DIA.	CUT LGTH.	SHK	LIST	SALE
85250M	1/4	7/8	1/4	11.80	8.85
85460M	1/4	7/8	1/2	14.90	11.15
85225	3/8	7/8	1/4	12.25	9.15
85241M	3/8	1	1/2	14.30	10.70
85227	1/2	7/8	1/4	12.70	9.50
85251M	1/2	2	1/2	17.40	13.00
85232	3/4	5/8	1/4	14.85	11.10

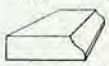
CORNER RD BIT TWO FLUTE

PART #	RAD.	CUT LGTH.	SHK	LIST	SALE
85294M	1/4	35/64	1/4	26.00	19.40
85296M	3/8	43/64	1/4	28.05	20.95
85594M	3/8	43/64	1/2	34.95	26.10
85297M	1/2	51/64	1/4	30.65	22.90
85595M	1/2	51/64	1/2	36.15	27.00



RABBETING BIT TWO FLUTE

PART #	RAB.	CUT LGTH.	SHK	LIST	SALE
85218M	3/8	1/2	1/4	24.15	18.05

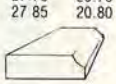


ROMAN OGEE BIT TWO FLUTE

PART #	RAD.	CUT LGTH.	SHK	LIST	SALE
85270M	5/32	15/32	1/4	31.80	23.75
85271M	1/4	25/32	1/4	33.95	25.35
85592M	1/4	25/32	1/2	43.15	32.20

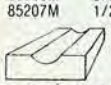
CHAMFER BIT TWO FLUTE

PART #	BEV.	CUT LGTH.	SHK	LIST	SALE
85298M	45°	5/8	1/4	27.70	20.70
85597M	45°	5/8	1/2	27.85	20.80



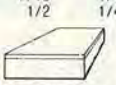
COVE BIT TWO FLUTE

PART #	DIA.	CUT LGTH.	SHK	LIST	SALE
85205M	1/4	1/2	1/4	28.95	21.60
85206M	3/8	9/16	1/4	29.05	21.70
85207M	1/2	5/8	1/4	29.95	22.35



CORE BOX BIT TWO FLUTE

PART #	DIA.	CUT LGTH.	SHK	LIST	SALE
85444M	1/4	3/8	1/4	16.20	12.10
85445M	3/8	5/16	1/4	22.45	16.75
85446M	1/2	3/8	1/4	23.05	17.20
85447M	5/8	7/16	1/4	23.05	17.20
85448M	3/4	1/2	1/4	23.70	17.70



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10020	3/16	1/2	3.85	3.65

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THE AMAZING 8-SPEED

Continued from page 45

BUILDING THE DISK-SANDER TABLE

1 Cut the sanding table's end (T), sides (U), and bottom (V) to size as listed in the Bill of Materials and as shown in the Disk-Sander Table Drawing. (Part T is dimensioned in the Table-End Drawing.) Bevel the top and bottom edges of the sides at 12° when cutting to size. Do the same to the edges of the bottom (V) that meet the sides.

2 Cut a hole through one of the sides for the vacuum-hose adapter.

3 Attach an 8″ sanding disk to the shaft so it clears part D. Notch both of the table's sides (U) for clearance against the sanding disk.

4 Glue and screw the end (T) to the bottom (V). Glue and screw the sides to the table's end and bottom.

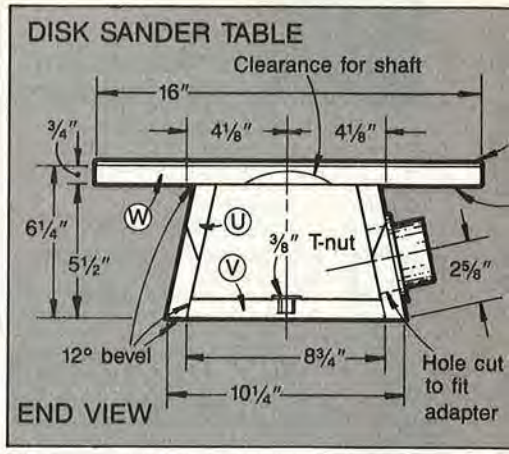
5 Mount the table-base assembly (T-U-V) on the cabinet, check for clearance, and drill two ½″ holes through the table's bottom and just far enough into the outboard shelf (E) to mark their position. Change to a 7/16″ bit and drill through the outboard shelf. Insert a ⅜″ T-nut into each of the ½″ holes in V. Attach the table-base assembly to the cabinet using machine screws.

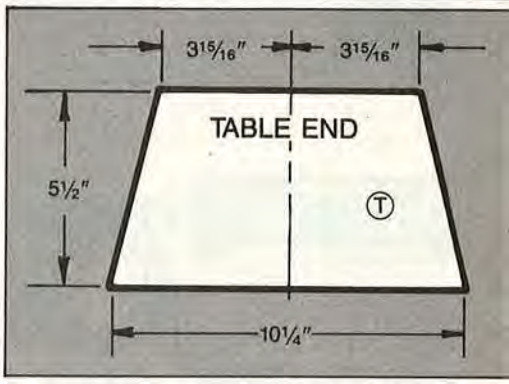
6 Cut the top (W) to size; lay out and cut ⅜″ radii on all four corners.

7 Temporarily position the top (W) on the table-base assembly. Mark where the sanding disk and shaft nut will need clearance. Cut the clearance notch slightly oversized, and fit it against the sanding disk and shaft to make sure there is no point of contact between the two.

8 Cut the laminate top and balance sheet slightly larger than the top. Apply the balance sheet to the bottom of the top with contact cement. Using a flush-cutting router bit, trim the excess balance sheet flush with the outside edges of W. Glue and screw the top (W) to the base (T-U-V). Apply the plastic laminate to the top of W and trim flush.

9 Use your miter gauge to mark the size and location of the groove on the top of W. Allow at least ⅛″ clearance between the edge of the miter gauge and the sanding disk.





Using a dado blade, cut the groove to size and test-fit the miter gauge. Mount the vacuum-hose adapter.

SANDING AND PAINTING

1 Finish-sand all surfaces. Mask off the laminate and magnetic catch hardware, electric cords, and switch. Remove the pulleys, motor, jackshaft, and mandrel.

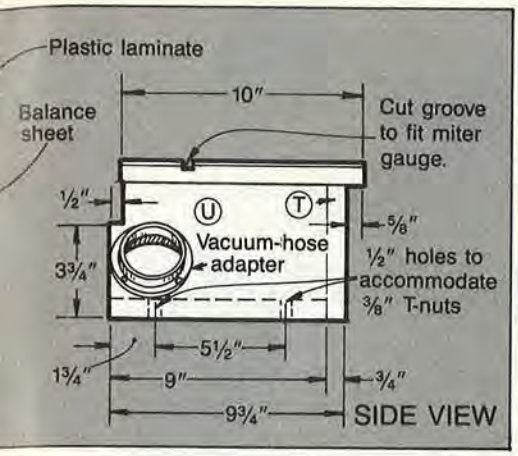
2 Apply a coat of primer followed by two coats of gloss enamel to the entire assembly.

3 Reassemble all mechanical parts. (The belts *must* go on before you fasten the jackshaft and mandrel.)

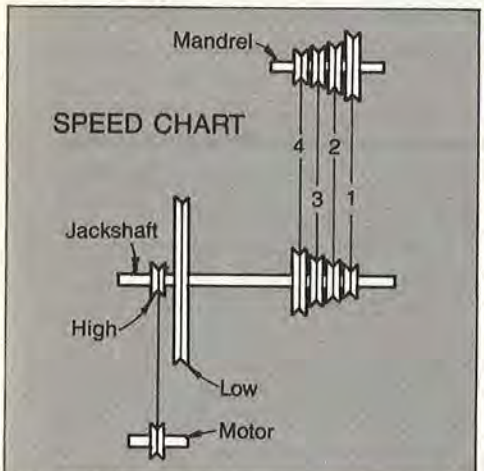
USING THE MULTI-MACHINE

See the Speed Chart, *right*, for the correct speed and belt placement for the various workshop uses listed. Photocopy the chart and tape it to the door. To switch from low to high speed, raise the motor with one hand and move the belt from the 10″ pulley to the 2″ pulley on the jackshaft. Slide the motor on the pipe to align the pulley with the 2″ pulley on the jackshaft.

To change speeds from the jack-



shaft to the mandrel, raise the motor and take the belt off the motor pulley. With the weight of the motor off the jackshaft, loosen the ¼" wing nuts on the jackshaft mounting blocks and raise the jackshaft. Move the top belt to the desired position. Reposition the lower belt onto the motor, which in turn pulls the jackshaft down. Then tighten the wing nuts.



BELT POSITION	R.P.M.	APPLICATION
Low—1	172	Wet grinding
Low—2	270	High-speed wet grinding
Low—3	445	Low-speed drum sanding
Low—4	690	Drum sanding
High—1	862	Drum sanding, pneumatic sanding
High—2	1340	Pneumatic sanding, disk sanding, flap sanding
High—3	2225	Grinding, buffing, wire wheel
High—4	3450	High speed polishing (Note: Power is low at arbor at this speed; do not overload motor.)

BUYING GUIDE

We obtained some of the mechanical parts for this project from Dayton, a wholesaler whose supplier is W. W. Grainger. If you have trouble locating Grainger parts, look in the yellow pages under "electric motors" for the Dayton dealer in your area. They'll inform you of local retailers. Grainger prices are not quoted here as they vary among retailers. Some parts are available from two sources, in which case we have given both companies' stock numbers and addresses.

- ***Mandrel assembly.*** ⅝×12"; ½"-20 R.H. and L.H. thread; comes with shaft, bearings, pulley, collars, flanges, and nuts; stock no. HO741. $16.95. Craftsman Wood Service, 1735 W. Cortland Ct., Addison, IL 60101, 312-629-3100. (We recommend using the heavier pillow-block bearings described below.)
- ***Ball-bearing pillow block (2).*** Used on jackshaft. Rigid-mount VPLE-210; ⅝" bore; self-aligning. Grainger stock no. 5X682. Craftsman stock no. HO738. $19.95 each. (Address above.)
- ***Motor.*** 1 hp.; 1725 r.p.m.; capacitor start; volts 115/230; ball-bearing; manual reset; stock no. 9GT1215C. $134.99 from Sears.
- ***Four-step pulleys (2).*** For type "A" ½" V-belts. ⅝" bore; stock no. 9GT27922. $6.59 from Sears. Grainger stock no. 4X560.
- ***2" pulleys (2).*** 2" outside diam.; ⅝" bore; stock no. 9GT28012. $1.69 from Sears. Grainger stock no. 3X896.
- ***10" pulley.*** 10" outside diam.; ⅝" bore; Grainger stock no. 3X935.
- ***Power-tool switch.*** Pull on/push off; stock no. 9GT13632. $21.99 from Sears. (Order by phoning your local Sears store.)
- ***Vacuum-hose adapter.*** 2¼" interior diam.; 2½" exterior diam.; stock no. AE0130. $3.50 from Shopsmith Inc., 6640 Poe Ave., Dayton, OH 45414, 800-543-7586 (in Ohio, 800-762-7555).

Produced by Marlen Kemmet
Project Design: James Downing
Photographs: Hopkins Associates
Illustrations: Randall Foshee, Bill Zaun

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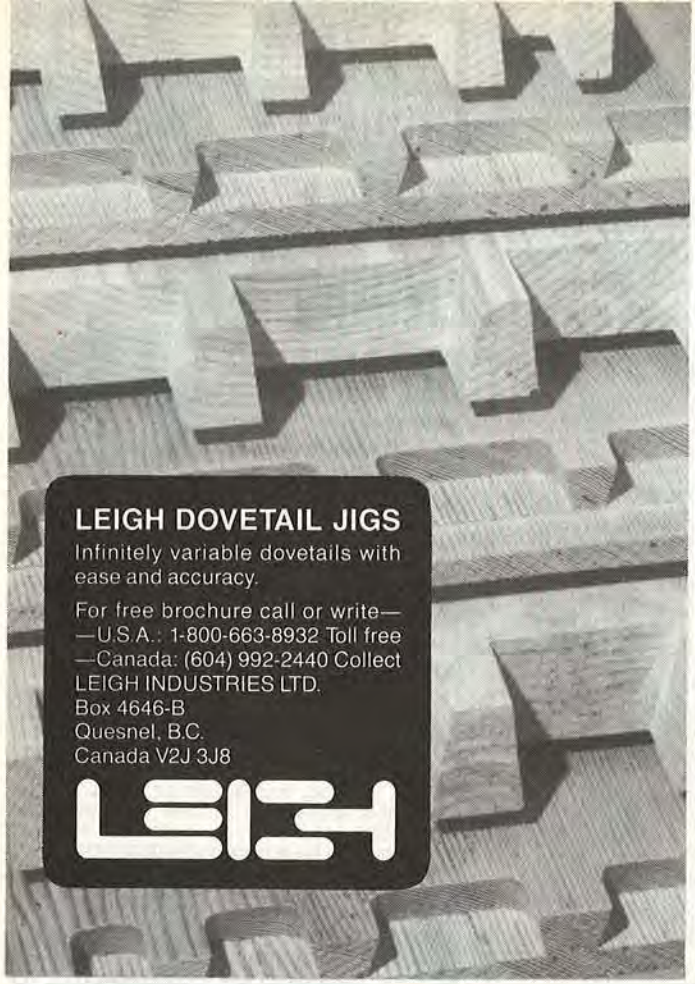

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WOOD ANECDOTE

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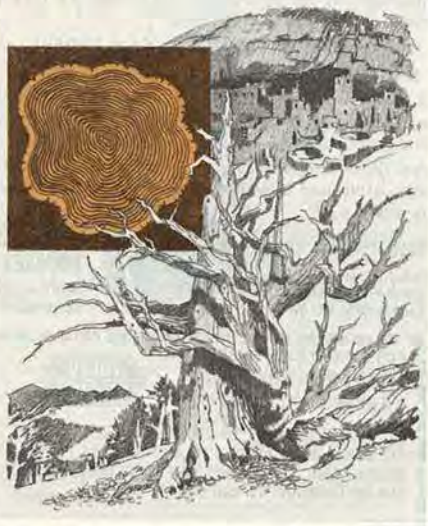
BRISTLECONE the Methuselah of the pines



The annual growth rings of bristlecone pine provide a fascinating, 9,000-year record of the environment.

Very little vegetation thrives at elevations above 8,000 feet. But the bristlecone pine, *Pinus aristata*, lives thousands of years in the mountains of California, Nevada, Utah, Colorado, New Mexico, and Arizona.

Among these oldest of the world's living trees is a California specimen that actually is named "Methuselah," for the biblical patriarch said to have lived 969 years. This tree has lived over 4,500 years, and still grows!

What secret does the bristlecone pine possess that enables it to thrive on the mountainous habitat it calls home? Gnarled by winds and stunted by the arid ground, these pines manage to survive by, of all things, learning to die slowly.

As bristlecones become old, they concentrate their vigor on a few branches, and thus prolong life. Even when completely dead, they resist decay and stand thousands of years more.

The wood of bristlecone pine yields firewood, fence posts, and mine shaft timbers for local use only. To archaeologists, though, its wood has provided a landmark revelation. By correlating the annual growth rings on both live and dead wood, they have been able to trace back weather patterns, volcanic reactions, fires, and other natural occurrences for 9,000 years.

Most importantly, traces of the radioactive isotope, Carbon 14, found in the dead wood of bristlecone pine at one location, exactly matched the carbon content of an ancient beam in the Mesa Verde cliff dwellings. This discovery allowed archaeologists to correctly date this civilization, and spawned a new research technique.

While the biblical Methuselah contributed only to legend, the bristlecone pine provides mankind with accurate records of the conditions in which it grows . . , then and now.

Illustration: Jim Stevenson

Continued from page 69

is to ensure that the edging sits 1/16" above the top of the aprons and legs, avoiding friction when you open and close the tabletop.

2 Cut the aluminum runners (M) to length. Sand or file the corners at a slight radius to remove burrs from cutting and to further ensure a smooth slide. Drill and countersink holes through the runners for #8 × 3/4" screws to attach the runners to the cleats (L).

3 Insert the aluminum runners into the 5/32" groove in E, and measure the distance between the bottom of the tabletop and the top of the runners for the correct thickness of the spacer. Ours measured 5/8" (see the Section-View Drawing for help with this). Cut the cleats to size.

4 Align the cleats (L) alongside the slide rails (E) and secure them to the bottom of the tabletop with #8 × 1 1/4" screws. Now, fasten the runners (M) to the spacers. Take your time aligning and fastening these parts; the outcome will determine how easily your tabletop will open and close.

5 Center and fasten the stop pads (N) to the inside edge of each end apron. Measure in 8" from the inside or closing edge of each half of the tabletop and fasten the stop blocks (O) to the bottom of the tabletop halves.

6 Using a helper, turn the table right-side up. Lay out and mark the position of three table pins in one of the tabletop halves. Using a doweling jig to ensure that the holes are drilled straight, drill 3/8" holes 11/16" deep. Insert dowel centers and bring the halves together with the edges aligned.

Drill corresponding holes in the other tabletop half, and insert (but don't glue) the pins to check for a proper fit with the halves closed. If the pins align properly, remove them and use this same procedure to mark and drill the leaves. Once all the holes are drilled, glue the pins in position.

7 Remove the stop pads (N) from the bottom of the tabletop. Slide the tabletop sections off the base. (The table is easier to finish with the top off.)

FINISHING AND FINAL ASSEMBLY

1 Finish-sand the entire base assembly and break any sharp edges on the legs and on the bottom of the aprons. Finish-sand the tabletop halves and leaves.

2 Mask the aluminum slides to prevent getting any finish on them. Stain, if desired, and finish the base, tabletop halves, and leaves. Be sure to finish both the bottom and top of the tabletop halves and leaves. (We left the oak natural and finished it with several coats polyurethane.)

3 Wipe on a bit of paraffin wax to the aluminum stock (M) and into the groove in the rail. The paraffin wax will lubricate the moving parts, helping to reduce friction and ensure smooth-sliding parts.

4 Reattach the top to the base and reinstall the stop pads (N). Using two people, turn the table upside down, being careful not to scratch the finish. Refasten the plywood panel (F) to the bottom of the table and stand the table on its feet.

Buying Guide

- ***Table pins.*** Turned hardwood pins, 3/8 × 1 1/4". Stock no. TP100. 45 cents for 10. Constantine, 2050 Eastchester Rd., Bronx, NY 10461 (or call toll-free to order, 800-223-8087).
- ***5/32"-point cutting ogee bit.*** Stock no. 9GT25583. $7.49 from Sears. To order, phone your local Sears store.
- ***Aluminum stock.*** 1/8 × 1 × 96" rectangular stock. Macklanburg-Duncan stock no. 0741-3123. $7.98 ea. You can purchase M-D parts at or through Ace Hardware Stores, True Value Hardware Stores, Payless Cashways Home Centers, and other dealers.

Produced by Marlen Kemmet
Project Design: David Ashe, Blueprint Workshop Company
Photographs: Hopkins Associates; Bob Calmer
Illustrations: Bill Zaun; Randall Foshee

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OFF WITH THE OLD

Continued from page 75

NONCHEMICAL WAYS TO REMOVE PAINT AND VARNISH

Usually, commercial paint and varnish removers offer the best way to strip furniture, but there are a couple of other methods for getting rid of an old finish, and occasionally they make better sense.

Scraping. Artisans who restore pieces for museums often prefer to shave off old finishes with cabinet scrapers, rather than risk subjecting valuable furniture to chemicals and lifting out the original stain, filler, or sealer. Also, some strippers break down old glues, causing joints to weaken. Obviously this process requires highly skilled hands and a lot of patience.

There is, however, one instance when you might want to consider scraping—with an old, badly cracked, flaking, dried out finish. When you can already see a lot of bare wood, especially on pieces such as outdoor furniture that have been exposed to the elements, stripper won't do a very good job because most of the vehicle, which stripper is formulated to liquefy, has already worn off. Fortunately, without a vehicle, the pigment has only a very weak grip on the wood, making it fairly easy to scrape away.

To scrape off a finish, use a cabinet scraper or a pull scraper, working always in one direction with the grain and held at a low angle. Keep a burr on the edge and rub in one direction—toward you. You are in essence shaving off the finish, but you don't want to cut the wood underneath.

Melting. Heat from a propane torch or an electric paint remover offers another, although risky, way to strip away an old finish. With a torch, you use a spreader tip and play the flame over the finish until it begins to buckle and lift, then scrape it off. With an electric paint remover, you hold it close to the surface until the finish softens, then you scrape.

Torching can easily scorch wood, or even set it on fire. Electric paint

removers work only on large flat or gently curved surfaces. Both are more appropriate for large expanses of woodwork, siding, or paneling than they are for furniture.

MANUFACTURER LISTING

Here's a list of some leading manufacturers of remover products. These companies provide information to consumers who write (free of charge, unless otherwise noted):

- W.M. Barr & Co. (Klean-Strip Removers), P.O. Box 1879, Memphis, TN 38101.
- H. Behlen & Bro. (Fire-Fly Remover), Route 30 N., Amsterdam, NY 12010.
- Bix Mfg. Co. (Quick Strip, Bix Stripper, Tuff-Job), P.O. Box 391, Old Hickory, TN 37138. Toll free number for technical advice: 800-251-1098.
- Chemical Products Co. (Kwik Removers), P.O. Box 400, Aberdeen, MD 21001.
- Duffy Products Co. (Duffy's Remover), 3209 1st Ave. SE., Cedar Rapids, IA 52402.
- Dumond Chemicals (Peel-Away stripper-impregnated fabric), 1502 Broadway, N.Y., NY 10036.
- Formby's Inc. (Formby's Paint Remover, Formby's Refinisher), Consumer Services, 825 Crossover Lane, Suite 240, Memphis, TN 38117.
- General Finishes (Dyna-Strip), P.O. Box 14363, Milwaukee, WI 53214.
- National Solvent Corp. (Nasco Remover), 955 W. Smith Rd., Medina, OH 44256.
- Red Devil Paint and Varnish Removers, 30 N. West St., Mt. Vernon, NY 10550.
- The Savogran Co. (Strypeeze, Super Strip, and Kutzit), P.O. Box 130, Norwood, MA 02062. Enclose $1.
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SEE-THROUGH PENDULUM CLOCK

Continued from page 80

work surface. Using the form body as a guide, scrape and sand the protruding edge flush with the form body.

8 Again, remove the lamination from the form body. Using a small combination square, mark a line 3¾" away from the edge just scraped and sanded. Using a fine-toothed handsaw, cut on the outside of the line just drawn to form an edge parallel with one sanded and scraped.

9 Remount the lamination to the form, and sand the edge that you just cut.

10 To trim the ends of the veneer parallel with each other, rescrew the base (D) onto the body form (A). Position and clamp the lamination back onto the form. Position and clamp a 1½"-wide board at the base of the form. Using the 1½" board as a guide, cut one bottom end of the lamination. Reclamp the board to the other side and cut the other end of the lamination.

11 Sand the lamination smooth. Hand-sand the front and back edges, forming a slight round-over.

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1 Cut a piece of ¼" acrylic to 6×13". Position the lamination over the acrylic and scribe the inner outline of the lamination onto it. Using a band saw, cut just outside the scribed line. Now, sand to the line until the acrylic fits snugly into the lamination.

2 To locate the shaft hole for the clock, measure down 3" and in 3" from either side of the acrylic. Drill holes to accommodate the clock shaft and winding key.

3 Position the acrylic ¾" in from the front edge. (We used ¾" scrap blocks and clamped these to the lamination, then clamped the acrylic to the ¾" blocks.) Drill and countersink pilot holes through the lamination and into the center edge of acrylic where shown in the Exploded-View Drawing. Fasten the acrylic to the lamination with #4×¾" screws. (We used brass

Continued on page 93

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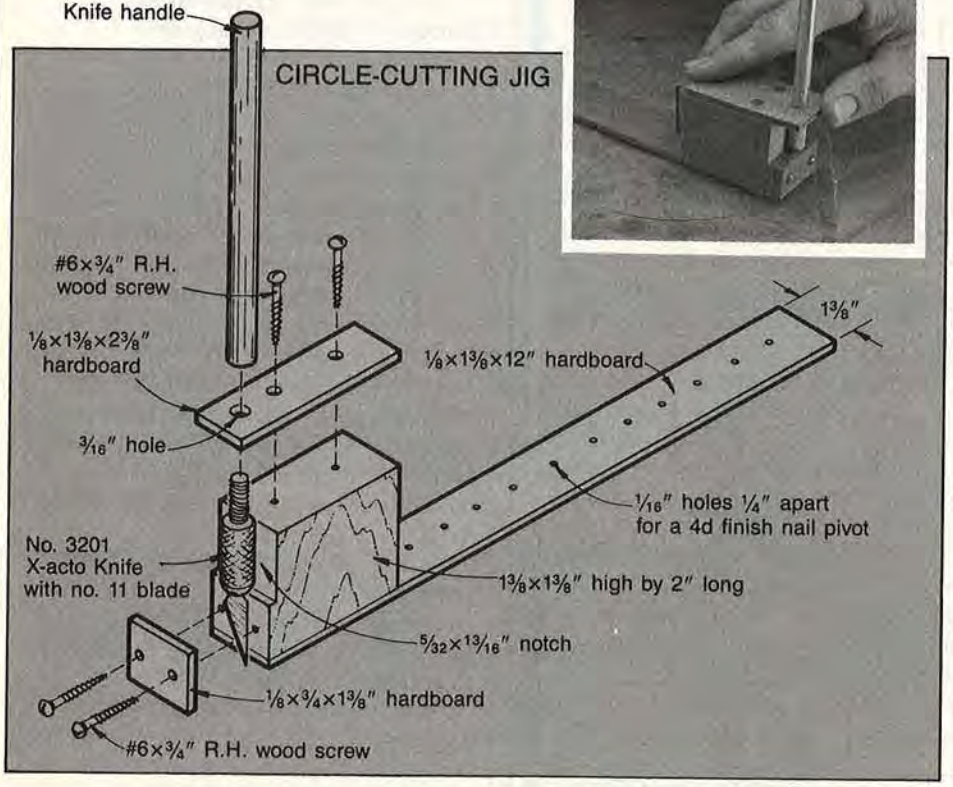

SEE-THROUGH PENDULUM CLOCK

Continued from page 90

screws for a classy look, but be careful not to over-tighten and break the screw head off. Brass is soft!) Remove the clamps.

4 Remove the screws and acrylic, and finish the veneer as desired. (We first filled the walnut, applied two coats of sanding sealer, and followed with two coats of gloss lacquer.)

5 Build the jig shown at *left*. Then cut the round veneer disk to shape as shown in the photo. (After several unsuccessful tries with a compass and an X-acto Knife, we came up with the jig shown for perfect circles every time. We used flexible Carpathian-elm burl for the disk. You can use regular veneer and glue it to the clock canister with contact cement, or easiest of all, use adhesive-backed veneer.)

6 Cut holes in the veneer disk to match those on front of the clock movement canister. Attach the

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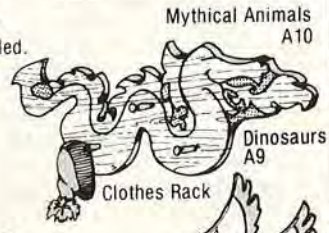

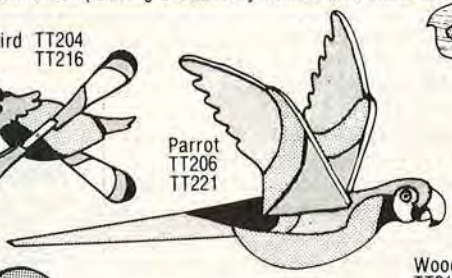

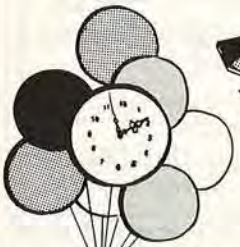

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SEE-THROUGH PENDULUM CLOCK

Continued

veneer disk to the front of the clock. (We left the veneer disk unfinished; you may want to oil yours to make the swirled-grain pattern really stand out.)

7 Fasten the acrylic to the lamination. Use a clean rag and a bit of glass cleaner to wipe the acrylic clean. Mount the clock movement to the acrylic with the two threaded inserts (included with the clock), then attach the hands to the front of the clock. Read the directions for winding the clock and starting the pendulum.

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● ***8-day "Time Only" pendulum movement*** (used in the burl-faced clock). 6¼" pendulum. Catalog no. 3361X, $28.50. ***Spade-black hands.*** Catalog no. 4904X, $2.50. Mason & Sullivan Co., 586 Higgins Crowell Rd., West Yarmouth, Cape Cod, MA 02673. To order, call 617-778-0475.

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Project Design: Jim Boelling
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TALKING SHOP with our project builder

Our resident woodworking pro, Jim Boelling, shares tips, commonsense advice, and 20 years of shop know-how.

How 'dead reckoning' keeps sailors and woodworkers true to course

Print this article

It was my Navy division officer who opened my eyes to dead reckoning. We steamed out of port one day, and by the next, we were surrounded by sea. I asked him, "How the heck do we know where we are, let alone how to get where we're headed?"

The answer was simple. Our course had been charted from a given: home port. Then our speed and direction were factored in to determine where we were and how we'd get to our destination. I've since found out that what applies to sailors applies to woodworkers, too.

What I mean is this: A project plan on paper is perfect. Nothing can go wrong with it. But as you build it, you can't assume everything is going according to plan. You have to stop and measure, or dead reckon.

Here's an example. You build a shelf system with a few upright supports dividing up the space. Following the plan, you cut full dadoes as indicated to hold the shelves. But, your shelf stock turns out to be shy of thickness. So, you end up having what I call a "rattling good" fit. Cutting those dadoes without checking the stock first put a knot in the rope that can't be untied at the end.

Look at the dead reckoning concept as a tool you use to overcome the variables in material, tools, and measurements that always seem to creep in a project.

Materials can throw you off

For one thing, count on *solid stock* to be a variable. It's processed to different tolerances. You can buy 1" stock at one place, and it will be 13/16" thick. At another, it will often measure out to 3/4".

Plywood, too, may vary from 1/32" to 3/64" off in thickness. By industry standards, that's OK, but your measurements will be off.

Make your cuts to suit the plus or minus factor of your materials, then measure from there, step to step, as you go. Remember, it's always better to measure twice and cut once.

Hardware also varies a great deal. You can't count on the same mounting clearance for drawer slides from two different manufacturers, for example. You have to buy all your hardware components *before* you begin a project.

Tools don't always tell the truth

Don't rely totally on the tilting-angle and depth-of-cut scales on most power tools. They're only indicators, like idiot lights in your car's dashboard. You must take the time to check all machine setups with an accurate square or folding rule before you use them.

After you've made the cut, dead-reckon the stock that will join it. Maybe you can right a wrong on the next cut. Let's say you made a 44½° miter cut. On the adjoining piece, cut the miter to 45½° and they'll mate to a perfect 90°

Mistaken measurements add up

Mismeasuring isn't always your mistake. Measuring instruments could have been dropped and dented or become rusty.

Beware of the inch lines on a rule or tape, too. They can be 1/32" to 1/16" wide. Make it a practice to always use the same part of the line—right edge, left edge, or center.

Finally, use the right measuring tool. Tapes hook over the end of a board. Folding rules measure up against or between two things. Double-check with the opposite tool. Always measure twice—it's part of dead reckoning.

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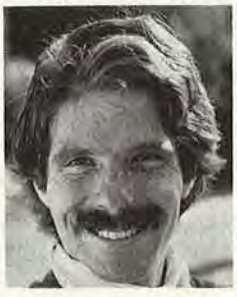
During a winter storm in the late 1700s, a huge black walnut tree toppled, smashing a chicken house into kindling wood and nine Sunday dinners. The next day, the farmer invited the woodworkers from town to come out and look at his windfall, and to stay for supper as well. The carpenter came, but said that the low-branching, open-grown walnut would be too hard to hew for building timbers. The wheelwright came, but said that the convolutions in the grain would make weak stock for his wagons. The cooper came around, too. He never had any use for walnut, but he wasn't one to pass up a free chicken dinner.

Earlier that year, though, a cabinetmaker had set up shop in the growing town. While others were in the kitchen gnawing the last of the bones, he remained outside, poring over the tangled mess of deep brown bark and emerald fronds.

He looked and thought. He felt the bark and figured in his head.



By Roy Underhill

Master housewright at Colonial Williamsburg and host of the popular PBS series The Woodwright's Shop, *Underhill is also an author and lecturer.*

He walked inside and struck a deal. Everyone was happy now—except for the chickens who had provided the dinner.

Careful sawing for cabinet wood

The cabinetmaker's men soon came for the tree and cut it into lengths exactly where he told them to. They hauled the logs back to his sawpit and spent the next three days sawing it into heavy planks. The cabinetmaker directed the lining out of every cut.

While he was away in the shop, the sawyers carelessly allowed the growing pile of slices to get out of order. There was much grumbling as he insisted that the planks be restacked just as they had been arranged in the tree. Hadn't he made it hard enough already, insisting that they saw straight through the heavy knots and gnarly crotch grain? They were relieved when the job was done, and only slightly amused when the cabinetmaker told them to report back in seven years.

Working the stock—years later

In the spring of 1793, the sawyers went at the walnut again. This time the cabinetmaker had them use a smaller, thin-bladed frame saw, but directed their work with just as much care. They recut some of the planks into strips as thin as ⅛"; others they left untouched. Now the sawdust, instead of being green, granular, and heavy, appeared brown and dusty, making them cough and sneeze. Their complaints were nothing, however, compared to those of the apprentice boy, who now had to plane the boards.

The apprentice had never seen anything like it. He had planed straight-grained pine for the cabinetmaker before, and had spent an

Fourth-generation master cabinetmaker Mack Headley works on a Chippendale desk like the one described in this article. The setting is the cabinet shop at Colonial Williamsburg.

extra twenty minutes sharpening his plane iron, but the wood tore out and the plane chattered and jumped as if it were a ball of spit on a red-hot stove. The cabinetmaker heard the accident and ran to stop him before the board was ruined. From his own tool chest (holy of holies!), he chose a plane with its iron set at a high-pitched angle, and for the next hour showed the boy how to follow and ride the flow of the grain as if he were running a canoe down a rocky rapids.

As the boy sweated at one bench, the cabinetmaker stood at another, trying different arrangements of the tan-brown stock. Deliberation soon gave way to delineation, and with folding rule, try square, and frequent reference to a large leather-bound book, he marked each piece before adding it to the stack on his bench.

The wood rejoined at last

The shop was now filled with the sound of sawing and pounding as

Continued on page 99

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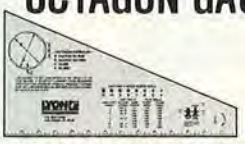

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Continued from page 96

master and apprentice cut the dovetails to join the pieces together. Three broad walnut boards and one of pine stood ready. Hot hide glue oozed from the joints as they drove them together. The walnut formed the upright sides and top; pine, the bottom, and for the first time the object of all their labor was clear. It was to be a slant-topped Chippendale desk.

The stretchers to separate the drawers came next. Were this Philadelphia, the dovetails that joined the stretchers to the sides would have been covered with a separate facing, but in this small town in the mountains honest joinery showed.

Slowly the cabinetmaker filled the empty spaces in the frame. One by one, the drawers took shape. On the front of each, a faint arc showed where a bend of the old walnut tree was recorded in the grain of the wood. The desk top showed the biggest figure of all, an oval of concentric rings. The sides, when examined closely, had the look of a handful of long, soft feathers. The desk, all woodwork completed, had the dusty look of a ghost. But not for long.

This same walnut in Philadelphia might have awaited a coat of shellac, refined from the imported exudate of a million Asian beetles. This country cabinetmaker, though, scraped the dirt from a block of local beeswax, rubbed it hard into the wood and polished it with a cork until the magic took effect. The faint figures in the wood came to life as purple-chocolate rainbows, bursting medallions, and flames that seemed to burn forever in the depth of the wood.

Six weeks of work spread over seven years now stood completed before the cabinetmaker. The finished piece embodied decades of work, if you counted the years of his own training. Centuries, if you counted the age of the tree. And millennia, if you counted the tradition of the cabinetmaker and his forebears through the ages.

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LUMBER SHOPPING: HOW TO BREAK THE SECRET CODE

Q. *I've seen terms like 4/4 and 5/4, referring to wood dimensions in various projects. How do I know what size wood to use?*

—John R. Wither, Williamsport, Pa.

A. You've probably noticed that we don't use those terms in *WOOD*—we think it's easier to relate to thicknesses stated as 1″ (which corresponds to 4/4), 1¼″ (5/4), and so forth. However, many hardwood lumber dealers do use these terms routinely.

The tricky part is knowing whether you're talking about *rough* or *dressed* (also called "surfaced") lumber. When you go to the lumberyard, specify rough lumber if you'll be surfacing the boards yourself. Otherwise, ask for S2S boards (surfaced on both sides). The chart, *below*, from the National Hardwood Lumber Association, indicates the difference between rough and surfaced dimensions.

STANDARD THICKNESSES OF SURFACED LUMBER

Rough	Surfaced	Rough	Surfaced
3/8″	S2S to 5/16″	1½″	S2S to 1 5/16″
1/2″	S2S to 7/16″	2″	S2S to 1¾″
5/8″	S2S to 9/16″	2½″	S2S to 2¼″
3/4″	S2S to 11/16″	3″	S2S to 2¾″
1″	S2S to 13/16″	3½″	S2S to 3¼″
1¼″	S2S to 1 1/16″	4″	S2S to 3¾″

BUYING A POWER SAW? TABLE THAT MOTION

Q. *What stationary power tool should I buy first for my home workshop—a table saw or a radial arm saw?*

—Gil Leinn, Evanston, Ill.

A. Buy the best 10″ table saw your budget allows, for a couple of reasons. First, a table saw is safer to use, since your workpiece will be between you and the blade. Second, a table saw is a better training ground for both accuracy of cuts and different techniques—from dadoing to resawing.

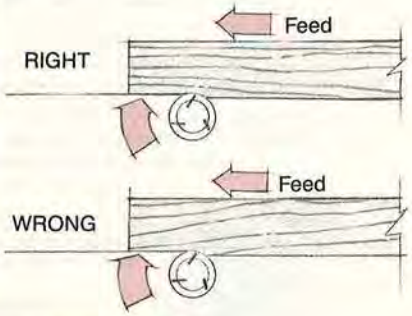
Don't economize by opting for a smaller table saw if you can help it. Most 10″ table saws have work surfaces that are large enough to handle any project you'd tackle and you'll be able to make cuts in material up to 3⅛″ thick.

GO WITH THE FLOW WHEN JOINTING EDGES

Q. *I have a problem with chipping out boards on my jointer. What am I doing wrong?*

—Thomas X. Scott, Indianapolis, Ind.

A. The most common cause of rough edges is feeding against the grain of the wood. Before you start jointing or planing, follow the grain in the board to determine its direction—and then feed in the direction of the grain or the majority of the grain. If you must cut against the grain—or the grain changes halfway down the board—slow your feed rate to compensate for the extra load on the cutting head.



GETTING UP TO SPEED

Q. *Can you give me the recommended operating speeds for motors on stationary power tools—I'm buying new motors for used equipment.*

—Jim Praschak, Plymouth, Wis.

A. Generally speaking, most stationary tools operate at two speeds: 3,450 r.p.m. for table saws, sanders, and jointer-planers— and 1,725 r.p.m. for drill presses, lathes, and band saws. If you're buying new motors, it's wise to spend $10–$20 more for units with ball bearings and built-in overload protection.

WHAT TO USE BETWEEN FINISH COATS

Q. *The "experts" at the hardware store can't agree: What should I use between finish coats—#0000 steel wool or 150- to 200-grit sandpaper?*

—Peter W. Daniels, Jacksonville, Fla.

A. Here's a happy instance where everyone's right. We recommend that you use steel wool on circular, convex, and concave shapes—and sandpaper on flat surfaces where even the slightest imperfections might be noticeable. To prevent finger streaks from hand-sanding, back the sandpaper with a wood or rubber sanding block.

WHAT YOU DO TO ONE SIDE, DO TO THE OTHER

Q. *Is it true in wood finishing that you should finish all sides?*

—Robert Allen, Phoenix, Ariz.

A. Since all woods are a little unstable and will change with temperature and moisture variations, it's important to finish all sides *equally*—right down to the same number of finish coats. If you finish one side of a board only, the wood might warp on the unfinished side. The same rule applies to using strippers and fillers.

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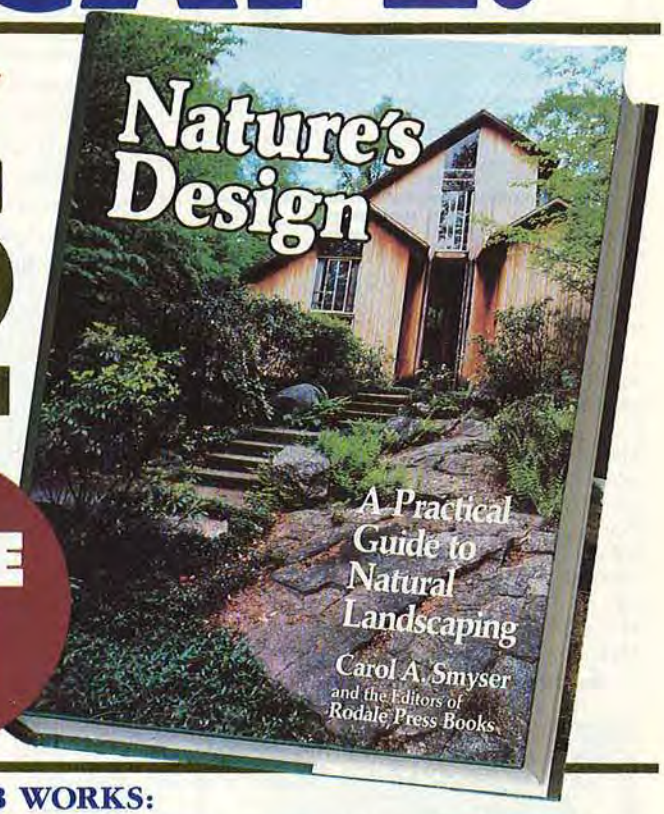

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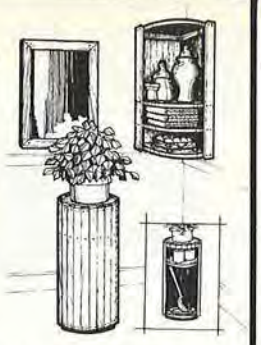

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How to properly tighten handscrews

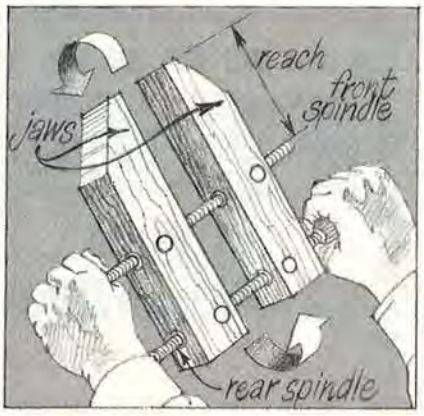
Handscrews—or parallel clamps—have several things going for them. First, unlike any other clamp, they can easily clamp parts that meet at odd angles. Second, they provide greater reach than most metal clamps. And if that weren't enough, they tend not to crawl or mar project surfaces when they're tightened.

Handscrews are produced in a dozen sizes. Maximum jaw openings range from 2" to 17", and reach (the distance from the front spindle to the jaw end) varies from 2" to 12". The hard maple jaws and cold-drawn steel screws last a lifetime, and have outlived many a woodworker.

If you have never used a handscrew, figuring out how to properly tighten one can be perplexing. But like most everything else, it's not hard once you know how to do it.

Clamping parallel surfaces

Start by making sure the jaws run parallel to each other. The best way to do this is to start with the jaws closed. Also, always hold the clamp the same way—grasp the rear handle in your right hand and the front handle in your left. With the clamp in hand, extend your arms, and imagine that the clamp handles are pedals on a bicycle. To close the jaws, "pedal" forward, rotating your wrists to spin the handscrew around. To open the jaws, "pedal" backward.



When clamping an object, adjust the jaws until they are slightly wider than the item being clamped, then position the handscrew with the front spindle as close to the work as possible.

With the jaws parallel to each other, and just slightly wider than the object being clamped, close the front spindle until it is finger-tight on the object, as shown below.

Now, grasp the front spindle handle and tighten it another ⅛ of a turn, as shown in the photo below.

Apply final pressure to the object being clamped by tightening the handle on the rear spindle as shown below. (The jaws of the handscrew must sit flush on the workpiece to distribute pressure evenly along the length of the jaws.) Closely eyeball the mating to check for continuous contact between the clamped project and the maple jaws. Light peeking through either near the jaw end or the front spindle indicates uneven pressure and may require adjustment or reclamping. It only takes a few practice clampings to get the "swing" of these versatile clamps.

Clamping projects at an angle

The goal remains the same when you clamp irregular objects: to bring as much of the jaw surface as possible in contact with the project being clamped.

Start by "pedaling backwards" to open the jaws. Turn either the front or rear handle to make the jaw ends come together or move apart at an angle. Adjust this angle to match the object being clamped (see photo at left). Place the clamp on the object and tighten either the front or rear spindle for continuous contact between both jaws and the clamped object. If "slippery" glue causes the pieces to slide, separate them and let the glue get a little more tacky before clamping.

Photographs: Larry Clayton
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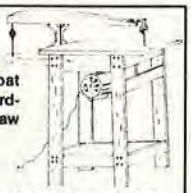

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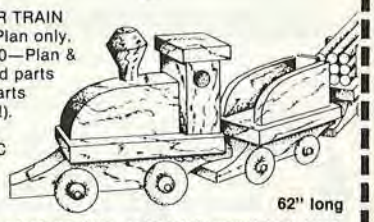

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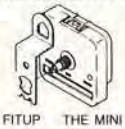

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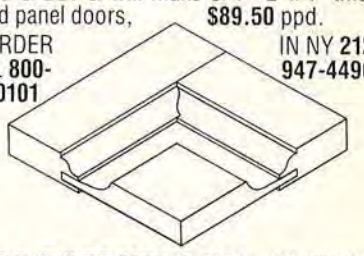

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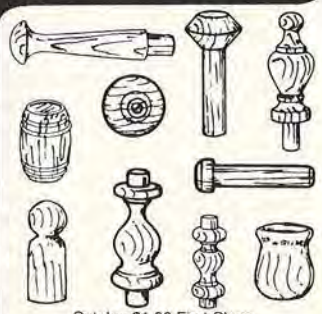

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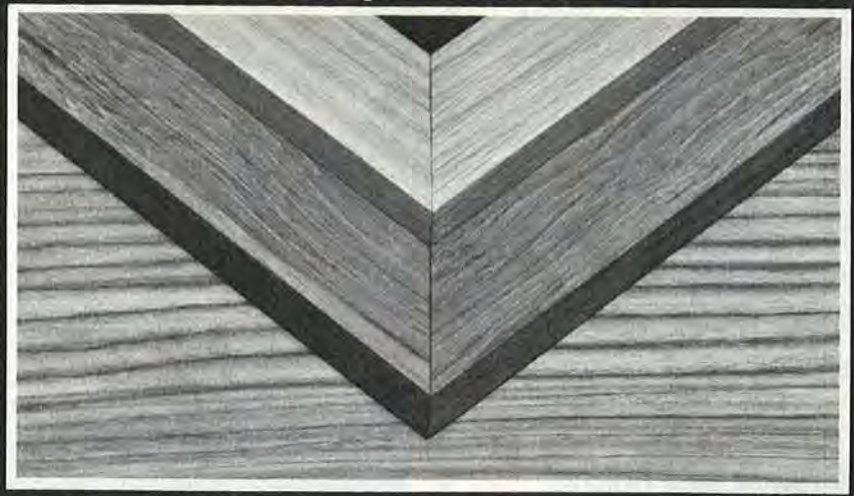

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Information

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The Bulletin Board

FACTS, FACES & FABLES
OF INTEREST TO HOME WOODWORKERS

CARVERS GO NUTTY

Your ivory disappeared? How will you make all those carvings, inlay pieces, and scrimshaw items you promised? Never fear, friend, help is here.

Thanks to Woodcraft Supply Corporation of Woburn, Mass., for letting us know about an ivory substitute in the form of very large, hard, and plentiful tagua nuts. Perfect for scrimshaw, carving, inlay, and even small turnings, the nuts come from the ivory palm *(Phytelephas macrocarpa)* of South America. Natives there have carved these nuts for centuries.

About 3″ long and 1½″ thick, the nuts seem rock-hard. When sliced, their insides resemble ivory. The secret to carving them, we found out, is to soften them by soaking in water for a day or less. Then, they carve easily.

Eight nuts cost $9.95, postpaid, from Woodcraft Supply, 41 Atlantic Ave., Woburn, MA 01888 (how-to instructions included).

FREE HELP IN IDENTIFYING THAT MYSTERY WOOD

When you come across wood you want to identify, but can't, what do you do?

Try the U.S. government. Madison, Wis. hosts the vast facilities of the Forest Service's Forest Products Laboratory, and they can help. In addition to research into maintaining, utilizing, and preserving our wood resource, the Laboratory also identifies it, free of charge.

There's no guarantee that they'll be able to tell you more than the wood's genus (oak, for instance) without your notes on origin and age, so provide this information if you can. Send a sample about 1×3×6″ in size for examination (be sure you can spare it, as the wood cannot be returned). For a free fact sheet describing this service, write: *Wood Anatomy Research, USDA Forest Products Laboratory, 1 Gifford Pinchot Dr., Madison, WI 53705-2398.*

AROUND THE NATION

Woodworking World Show, Jan. 10–12. Shamrock Hilton, Houston, Tex. Tools, demonstrations, seminars. **Jan. 24–26.** Constellation Hotel, Toronto, Ont., Canada.

Crafts-at-Close-Range, Feb. 8. Old Sturbridge Village, Sturbridge, Mass. Workshop on coopering. Requires reservation. Phone 617/347-3362.

The Woodworking Show. Feb. 14–16. San Diego Convention Center, San Diego, Calif. Supplies, tools, lectures, demonstrations.

Woodworking World Show, Feb. 14–16. Veterans Memorial Hall, Columbus, Ohio. Demonstrations, tools, seminars.

ACC Craftfair, Feb. 26–March 2. Baltimore Convention Center, Baltimore, Md. 500 fine craft exhibitors selling.

Craftmarket America, Feb. 26–28. Omni International Hotel, Baltimore, Md. 300 exhibitors selling fine crafts.

The Woodworking Show, Feb. 28–March 2. Pasadena Center, Pasadena, Calif. Lectures, tools, demonstrations.

Woodworking World Show, Feb. 28–March 2. Hyatt Regency Crystal City, Arlington, Va. Tools, demonstrations, seminars.

HARDWOOD LUMBER LEADER FRANK PAXTON, JR.

Frank Paxton, Jr.

West to the Rockies, east to the Ohio, and south to the Gulf, Frank Paxton Lumber Company heads the list of hardwood suppliers to industry, cabinet shops, millwork houses, and school shop programs. Their "Beautiful Woods" retail stores offer hardwoods to home craftsmen.

At the helm of this 72-year-old firm based in Kansas City, Mo., is Frank Paxton, Jr., 67, who tells as many tales as there are woods.

Once, in the Bolivian mountains, Frank bought the only carload of *lapacho* wood that he believes ever entered the U.S. (Lapacho is an exotic hardwood resembling magnolia.) The entire shipment went for flooring in a Kansas City art museum. "I was lucky the architects loved it," he says, "there wasn't a demand for it anywhere else."

On his honeymoon, Frank traveled with his bride, Millie, to Africa. There they watched natives of the Cameroons harvest zebrawood. "I had to take her to Paris on the way back," he relates.

A hardwood mogul he may be, but a woodworker he is not. Frank says his dad, who founded the company, made him take enough woodworking classes to last a lifetime. He loves wood, though, and marvels at what even amateur woodworkers make today. He's concerned that the skills taught in vocational education, which contribute to the present high quality in woodworking, may be abandoned by schools in the near future.

"It's important that academics be applied," Frank states. "Youngsters should learn to use their hands as well as their minds, and build something."

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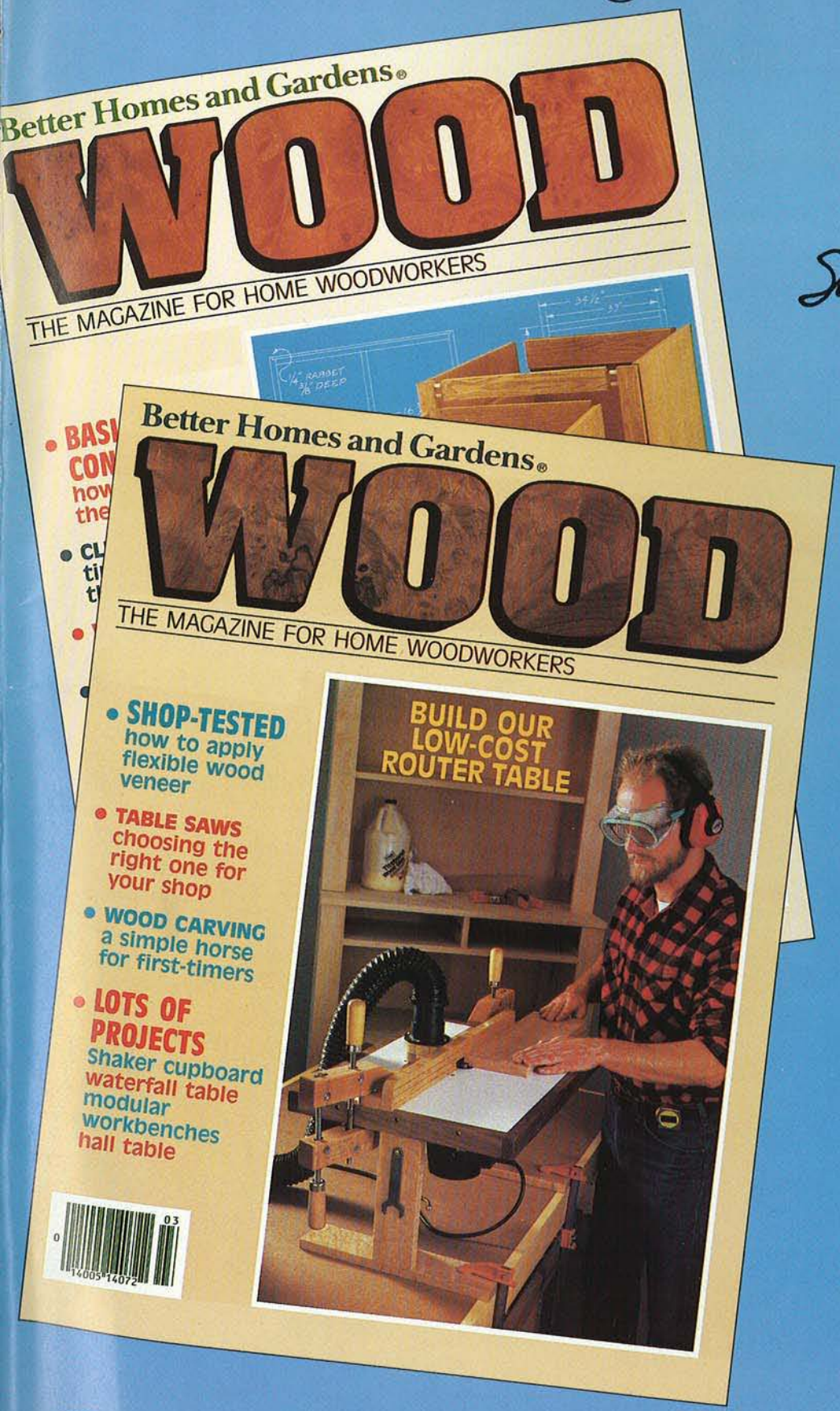
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Combination Grind

LU84M
Hook angle 7°
Carbide Used: C4

While this type of blade is a compromise of the following blades, it will give you the results you expect in your shop. No one blade will do it all, however this is the one that comes closest. Most woodworkers we know have one of them. They are practical and inexpensive.

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Hook angle 7°
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This is the world's best production made carbide sawblade. You can be sure of one thing that we are out to prove: You can spend as much as twice the price of our LU85M blade, but you will not find a better one!! We guarantee it! The use of this blade should be limited to super fine finish work only. The primary and secondary bevels and the teflon coating make this unique sawblade so very precise that the cut seems effortless in all kinds of materials.

Flat Top

LM72M
Hook angle 20°
Carbide Used: C2

This blade is designed for fast ripping along the grain of the wood. Excellent finish is obtained when ripping. The advantage of using a C2 grade carbide is to allow us to use an aggressive 20° hook for fast ripping and yet go through occasional knots without fracturing the tips.

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